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The Facilitative Effects of Total and Oral Communication Methods of Language Development Training on the Language Performance of Severely Retarded Children in a Day School Program

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THE FACILITATIVE EFFECTS OF TOTAL AND ORAL COMMUNICATION METHODS OF LANGUAGE DEVELOPMENT TRAINING ON THE LANGUAGE PERFORMANCE OF SEVERELY RETARDED CHILDREN IN A DAY SCHOOL PROGRAM

by

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DEDICATION

This work is dedicated to my parents, Dorothy and Irving, without whose love and support, would not have been accomplished.

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Fond thanks and love to Dick, my husband, and my friends who helped me fulfill this goal.

VITA

The author, Anne Wolfe-Williams is the daughter of Dorothy and Irving Wolfe. She was born November 11, 1951 in Chicago.

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CHAPTER I

INTRODUCTION

Mental retardation affects from two to three percent of the population of the United States. Historically, teachers of the retarded have considered their role as 'protectors' or 'custodians' to guard the retarded child from society. The retarded have been isolated from social interactions and have not been taught to communicate with other people.

Researchers in the field of mental retardation have noted the significance of language and speech in the development of mental operations. Language appears to be a decisive factor for the extent to which skills can be acquired (Clarke, 1958). It has been demonstrated in studies (Hermelin and O'Connor, 1958; Spiker, Gerynoy and Shepard, 1956; Luria, 1961) that verbalization is important to problem-solving and discrimination learning (Mein and O'Connor, 1960). Evidence indicates that language affects the acquisition of skills.

It has only been within the most recent years that the public education system has accepted the responsibility of providing educational systems for the mentally retarded. Educators are faced with both theoretical and practical problems in establishing programs for the mentally handicapped. One major and crucial question in the field of mental retardation which attention must be focused on is the definition of mental retardation.

Definitions of retardation have stressed various aspects of limited intellectual functioning. Tredgold (1956) and Benda (1954) have defined retardation as incomplete mental development that prevents the person from adapting to the normal environment and maintaining his existence independently of supervision or external support. Doll's (1941) definition of retardation is "social incompetence, due to mental subnormality which has been developmentally arrested, which obtains at maturity, is of constitutional origin and is essentially incurable". In contrast, Kanner (1957) focuses his definition on the degree of the handicap and the nature of the environment to which the person must adjust.

IQ classification is another dimension basis for defining mental retardation. Both Terman (1960) and Wechsler (1955) have described IQ scores along a continuum of mental ability.

The difficulties with these traditional definitions of mental retardation are that they are stated in terms of adult behavior which makes the definitions very difficult to adapt for use with children and secondly, they lack definite criteria for defining the classifications of intelligence. For a definition of retardation to be useful and to have meaning, it must include an estimate of both the present functioning abilities of the person under optimal conditions and potential abilities and growth.

The American Association on Mental Deficiency has introduced a succinct, carefully worded definition of retardation. "Mental retardation refers to subaverage general intellectual functioning which originates during the developmental period and is associated with

impairment in adaptive behavior." This definition stresses a developmental approach. It gives a description of mental status in terms of present behavior (Heber, 1961).

The AAMD definition of retardation is not all encompassing and does not answer all questions. However, it is a very useful perspective to use in approaching the problem of providing educational development programs for retarded children.

A brief discussion on the various levels of mental retardation is intended to show that mental retardation is a generic term describing four distinct groups (mild, moderate, severe, and profound). It should be recognized that there is considerable variation between individuals.

The largest group of the mentally retarded is represented by the educable mentally retarded (mild retardation). They approach the low average in terms of physical characteristics. Identification of a child as a mild retardate is usually not made until one, possibly two, years of regular school attendance.

The trainable mentally retarded individual (moderate retardation) presents neuropathological conditions. In most cases, motor development approaches normal.

Those persons who are classified as being severely mentally retarded have considerable damage to the central nervous system as well as organic pathology and other handicapping conditions. Motor development is retarded, as are speech and language. Many require intensive and extensive medical and nursing care, while others, because of organic brain damage, are somewhat difficult to control.

Those individuals who are classified as profoundly retarded usually have considerable central nervous system impairment and organic pathology is present to an unusual extent. Many profoundly retarded persons present other types of handicapping conditions in addition to mental retardation, such as blindness, deafness, epilepsy and gross physical anomalies. Their motor, speech, and language development is very poor. Frequently, one may observe patterns of repetitive behavior such as rocking movements, head banging, biting of hands, and other stereotypic behaviors.

The present study was concerned with the severely mentally retarded population. The orientation in education for the severely retarded student has been that the problem exists within the person. Recently, this orientation has been questioned. Emphasis has shifted to experiential and environmental factors. Though teachers cannot control factors of brain damage or birth injuries, teachers do have control over environmental factors. Through systematic manipulation of environmental variables with instructional technology, teachers can change response patterns and life styles of severely retarded students. Efforts are now being directed toward mainstreaming the retarded children into society; to work; to live in a home setting with others. At last, the severely retarded are being prepared to live in the real world and not the institution.

The term "severely retarded" (Heber, 1961) refers to individuals who have been labeled as "low functioning", "developmentally young", multiply handicapped" (Stephens, 1971), "subtrainable" (Kirk, 1972),

"custodial", ad infinitum. "Severely handicapped students are not toilet-trained; aggress toward others; do not attend to even the most profound social stimuli; self-mutilate; ruminate; self-stimulate; manifest durable and even intense temper tantrums; are not even under the most rudimentary forms of verbal control; manifest minimally controlled seizures; have brittle medical existences; do not walk, see, hear, or speak" (Sontag, et al, 1973).

The developmental lag hypothesis of mental retardation states that the cognitive development of a retarded child proceeds through the universal stages of normal development, but at a slower rate (Zigler, 1969). Little research has been done related to the cognitive development of the severely retarded. Piaget's (1963) studies indicate that the severely retarded function at the sensorimotor level of development. Other studies (Woodward, 1959; Bricker and Bricker, 1973; Robinson, 1974; Wohlheuter and Sindberg, 1975) have shown that many of the severely and profoundly retarded subjects function at one of the six substages of the sensorimotor period.

According to Piaget, a person begins to acquire language at stage six of the sensorimotor period. This is the transition from perceptual motor behaviors to verbal behaviors. Mental images develop at this sixth stage when prior to this state there was no imaged representation. The child begins to develop the necessary cognitive structures to represent objects and events that he is not directly perceiving. When these cognitive structures are developing, the child is capable of acquiring expressive language (Kahn, 1977). Techniques of operant conditioning may not be successful if the child

has not developed the cognitive structures for representation. However, the literature on transfer of training and learning set formation is difficult to demonstrate with severely and profoundly retarded subjects (Bricker, Heal, Bricker, Hayes, and Larsen, 1969).

Progress in language abilities paves the way for progress in all areas of learning. It would be a great benefit to find the best methods of training possible to give a severely retarded person the opportunity to reach his full potential in language development which would facilitate growth in other behavior (interactions, social skills, self-help skills, etc.) and in social adjustment. Verbal behavior may be considered the most important aspect of the normal child's developmental repertoire (Risley and Wolf, 1967). Teaching communication behavior to the nonverbal child has led to many programs for teaching verbal skills (Bricker and Bricker, 1972; Gray and Fygetakis, 1968; Miller and Yoder, 1972; Stremel, 1972; Kent, 1972).

For language training to be efficient, training has concentrated on verbal imitation as a discriminated verbal response (Baer and Sherman, 1964; Metz, 1965; Bricker and Bricker, 1966; Baer, Perterson, and Sherman, 1967). Reinforcement theory principles has also been applied to the speech training techniques (MacAuley, 1968; McReynolds, 1969; Sloane, Johnston, and Harris, 1968). After this initial phase of imitation training, the design is to teach functional and spontaneous speech in a variety of settings and with various people (Hartung, 1970).

An alternative approach to developing communication skills in the severely retarded language delayed child is the total communication

approach (Larson, 1971; Levett, 1969; 1971; Bricker, 1972). Total communication approach pairs speech signals with signs simultaneously. The ability to acquire and use signs enable a functional non-linguistic system of communication for those who have not acquired language (Schaffer and Goehl, 1974). The typical phases of training are: non-verbal responding; non-verbal gesture; discrimination responding; manual signing; discrimination of signs; manual discrimination of alphabet letters and finger spelled words; reading; and finally speaking and understanding speech. These phases are outlined in accordance with "normal" language acquisition (Berger, 1971). The sequence of training does not imply that every child will become linguistically competent as the goals are established according to the individual's needs and capacities.

It is very possible that present oral language training programs have not been adequate to help the severely retarded child to advance further, to maximize his progress in language development and that importance of the relation of language to social development has been overlooked. In the present investigation, it was hypothesized that:

1. A Total Communication program of language training results in promoting increased language development as measured by selected language scales.

2. Improved language skills ability prompts improved social skill performance.

3. There is an inverse relationship between chronological age and the rate of acquisition of signs and/or oral vocabulary.

4. There is a positive relationship between measured social

skills ability and a social skills rating by judges.

Fifty-six severely retarded nonverbal children ages three to eighteen of both sexes were randomly assigned to either the Oral Language Control group or the Total Communication Treatment Program. Each subject was pre-tested on language, social, and developmental measures. After a twelve month school year, the subjects were posttested on the same measures.

The scores from the language and developmental scales were analyzed by a 2x3x3 completely randomized factorial block design. The social skill scores were analyzed by a 2x3 factorial design. Simple regression analysis was used to explore relationships between language and chronological age as well as relationships between measures of social skill ability and a social skill rating.

Educational Implications

The problem of planning training programs for the severely retarded child has only in recent years earned the attention of special educators in the community. The primary reason for this lack of attention has been that the popular practice in dealing with severely retarded children has been to ascribe to them the inability to learn and thus the inability to profit from any educational program, and to send them off to be cared for in institutional settings. Serious attempts are not being made to devise educational programs to maximize learning processes in the severely retarded child. Education for these children is oriented to their deficits in development. The curriculum focuses on skill building to meet the maximum of the child's

developmental potential based on the present developmental stage; the anticipated growth; and the ultimate developmental stage (Johnson, 1975).

Research on severe and profound mental retardation has been focused primarily on behavior analysis and operant conditioning. Recently, there has been a shift in emphasis to individual response generalization, complex thought processes, and communication skills. Given the high cost, both personal and social, of severe and profound mental retardation, further research appears to be worth public support.

The function of language, the methods by which a child relates to his environment, and the influences of language on the life and personality of any growing child are matters of concern to all those who are responsible for his or her development.

Progress in the mastery of language is not a matter only of planned instruction, but rather, a process of natural development and maturation in an environment which provides stimulation and guidance. Language and thought develop together as an integrated whole. Language is of little value without ideas to express, and ideas themselves are dependent on language. The severely retarded child's limited repertoire of behaviors and cognitive skills impair his ability to communicate with others. His deficiency in communication skills impedes his development in the cognitive, linguistic, and social domains. The learning process is limited unless the child develops the critical communication processes.

The development of functional communication skills appears to be requisite if the severely retarded person is to function independently

in the least restrictive environment. Educators have begun to consider the value of developing augmentative systems of communication training. Continued research efforts are required to validate the efficacy of manual and total communication strategies of language instruction for the severely mentally retarded.

CHAPTER II

REVIEW OF THE LITERATURE

Until recently, little attention has been given to the problem of providing and improving educational systems for the severely retarded population. In order to maximize efforts to generate methods of training and teaching, educators must examine the entire assemblage of factors which affect the retarded person. To develop an effective approach to the problem, learning characteristics; attention behaviors; motivation; cognitive behaviors; language characteristics; and social behaviors of the retarded should be considered when proposing a particular model of language acquisition.

Learning Characteristics of the Mentally Retarded

A retarded person faces many handicaps which are complicated. Many of these handicaps have been neglected because the individual is not accepted as a social person who is capable of higher language development (Lillywhite and Bradley, 1969). Frequently, the retarded individual is characterized by an IQ score which tends to ignore individual differences in behavior and personality (Sarason, 1959).

An IQ score adds little to what a person knows about another individual. An IQ score only provides an indirect measure of what has been observed directly. According to Baumeister (1965), it would be more relevant to determine whether the IQ was valid for making reliable prognostic determinations regarding the retarded person.

This is to say, how would the individual respond and adapt to his environment? "All too often mental retardation is regarded as a unitary, pervasive deficit, i.e. lack of intelligence. ...but, research is quite clear on this point--mental retardates are less deficient in some areas than they are in others. On some measures, in certain learning situations they may perform as well as "normal" individuals. The more refined we make our analyses of adaptive behavior, the clearer it becomes that we must speak of specific deficits in particular skills or processes" (Baumeister, 1965, p. 881).

Evidence indicates that the mentally retarded learn in the same way as 'normal' individuals. The rate of intellectual development is retarded. There is not a difference in the learning of a 'normal' person of the same mental age. Therefore, the difference is not one of the learning process but of the individual's developmental stage. "Learning is dependent on a number of variables of which intellectual development is an important one" (Johnson, 1959, p. 68). Johnson further states that it is one's intellectual developmental level which will affect the maximum level of learning that will take place at any specified time. Therefore, if one is to compare the mentally retarded and the normal groups while holding developmental age constant, "they will have similar patterns of learning, require the same amounts of material learned" (Johnson, 1975, p. 464).

Other researchers have compared mentally retarded and normal children's performance on serial learning tasks. Cassell (1957) noted that there were no significant differences in performance with the factors or retroactive inhibition. Berkson and Cantor (1960)

studied verbal mediation and found facilitation effects were similar for both the mentally retarded group and the normal group.

Cruickshank and Blake (1957) and Johnson and Blake (1960) compared the performances of institutionalized mentally retarded boys and normal boys on several types of learning tasks. The results of both studies indicated that both groups are comparable on tasks of sensorimotor learning, transfer, discovery and application of a principle. However, if the task involved psychomotor skills, the retarded group did significantly better than the normal group (Johnson, 1958). The normal subjects performed significantly higher only on the paired association tasks.

Researchers have identified several factors which have been observed to hinder an individual's learning of language and acquisition of linguistic skills. These are attention, motivation, cognitive, and social behaviors. Specific language characteristics of the severely mentally retarded will also be reviewed.

Attention Behaviors of the Severely Retarded: In early studies of attending sets of the mentally retarded, Barnett and Cantor (1957) noted that learning performance was improved by giving instructions for the task and the stimuli for which to look (which cued the task). Bensberg (1958) found that the rate of learning by mentally retarded subjects could be controlled by developing sets to attend to specific cues of the task and the rate of correct responses also increased (Zeaman and House, 1963).

Crosby (1972) observed that retarded persons do not maintain attention to appropriate stimuli because they are distracted by and

respond to irrelevant stimuli. Though susceptible to irrelevant stimuli, performance can be significantly improved through a program which begins shaping attention skills (Bricker, 1972).

Motivation Factors in the Severely Retarded: Whether the severely retarded person is institutionalized or living with family, he has experienced many failures in experiences and has not been properly reinforced for his behavior. In fact, there are very few opportunities or times in which the severely retarded person is encouraged to act. These variables drastically affect cognitive behavior. Zigler (1966) has suggested that any learning program should incorporate increasing the person's motivation. This can be done by structuring programs so that successful learning experiences are attained.

Cognitive Behavior of the Severely Retarded: In order to discuss the language behavior of the retarded, the cognitive component should be considered. Bloom (1970) has stated that in order for language to develop the child must be able to perceive objects, events, and stimuli. Though susceptible to irrelevant stimuli, performance can be significantly improved through a program which begins with shaping attention skills (Bricker, 1972); linguistic experience; and nonlinguistic experience. It has been proposed that cognitive development affects the rate of linguistic development and that language depends on the degree of the person's conceptual development (Slobin, 1970; Sinclair, 1970, 1971; Church, 1971; Mehrabian and Williams, 1971).

According to Piagetian theory, it is necessary for the appropriate

cognitive structures to develop in order for learning to take place. The cognitive structures which are prerequisite for expressive language development do not develop until Stage 6 (the invention of new means through mental combinations) of the sensorimotor period. In normal development, this substage occurs between 18-24 months. During this period, the child is becoming more aware of the interrelationships which occur in the environment. At this time, the child begins to make symbolic associations. Substage 6 is the transition period to the pre-operational stage (Piaget, 1951, 1963, 1964). At the end of the sensorimotor period, the child is cognitively able to differentiate himself from the objects of this environment. The child can order and classify things spatially and temporally. He can relate objects and actions.

These sensorimotor schemata which produce the need of the child to communicate are formed during this period. Having developed these structural properties, the child is ready for comprehending and producing language (Sinclair, 1971; Kahn, 1975).

Although Piaget did not extend his theory to the mentally retarded, other researchers have applied his concepts to studies of the cognitive characteristics of the retarded. Woodward (1959) studied 147 profoundly and severely retarded children's performances on problem solving tasks of the sensorimotor period. She found that all subjects were functioning below substage 6.

Sigel (1964) applied Piaget's theory of development to the mentally retarded. He stated that the order of the stages is present but they occur at different chronological periods. Sigel noted that the

rate of progress of the retarded through the stages differs considerably from the normal group. He concluded that the degree of the person's ability to conceptualize is directly related to the severity of the retardation (Sigel, 1975).

Inhelder (1968) stated that the severely retarded develop cognitively in a similar sequence as normal and above average children, but the retarded remain fixed at the sensorimotor level of intelligence. In other words, the retarded child attains a false equilibrium and does not progress past that stage. As a result, the severely retarded child does not construct mental operations.

According to Piaget (1964), classification skills are basic to the individual's ability to organize similar and dissimilar qualities into groups by defining a common attribute. Comprehension, cognitive style (Kagan, Moss, and Sigel, 1963), developmental and experiential level of the child, and the nature of the stimuli are all crucial factors in the classification performance. O'Connor and Hermelin (1957) observed that the severely retarded could use the principles of classification but could not verbalize the concepts. Milgram (1968) studied trainable retardates' verbalizations and conceptual classification skills. He found no significant differences on conceptual classification tasks among the trainable and educable mentally retarded, and normal children. However, the trainable retardates did significantly more poorly on verbalizations of concept tasks. Milgram noted that the deficiency in verbalization skills increased with the severity of the mental retardation. Later, Milgram (1973) suggested that if verbal aspects of learning are

stressed, the retardate's cognitive capability will not be assessed correctly. Stephens (1966) compared retarded and normal subjects' ability to categorize, to classify, and to name. He found that the retardates understood categories but had difficulty in verbally conceptualizing the relationship.

There has been research evidence to indicate that the child must acquire certain cognitive operations to be able to comprehend and produce linguistic forms (Cromer, 1972; Brown, 1973). Bloom (1970) stresses the cognitive skill of production in her analysis of language acquisition. In contrast, other researchers state that the processing language is the crucial cognitive factor (Menyuk, 1964). Menyuk (1969) observed language delayed children and found their syntactic structures were infantile when compared to normal speaking younger children. Poor auditory memory limited the children in recalling utterances of more than two or three morphemes. Graham and Guilford (1968) found similar results when subjects with poor short term memory were unable to process sentences of increasing syntactic complexity. Lee (1966) noted that language delayed children are unable to make linguistic generalizations.

The research indicates that deficits in certain cognitive abilities of the retarded limit language acquisition. It has been demonstrated that particular cognitive processes may be prerequisite for language acquisition.

Language Characteristics of the Severely Retarded

Although most researchers will agree that language development

in the mentally retarded is delayed, there have been few studies which have analyzed the language characteristics and language development. It is also important to discuss the language characteristics of each functional level of retardation as the processes involved in language development will differ considerably. Due to problems in designing experimental studies of language, the language characteristics of the severely retarded have not been well defined.

Severely retarded children (IQ score 15-50), living at home, were studied in order to compare their linguistic development to the norm. Karlin and Strazzella (1952) observed that in general, there were delays in attaining most developmental milestones. The lower the measured intelligence score, the greater the delays in development such as babbling, word utterances, and sentences. The greatest delay was use of simple words and sentences when the severely retarded children were compared to normal children. The researchers concluded that their findings reflected the slower maturation rate characteristic of the development of the mentally retarded. Analyses of acoustic data of multiply handicapped subjects show that there are fewer opportunities for the subjects to be exposed to verbalizations and that the verbal engagements they did experience did not enhance verbal behavior (Kaczmarek, 1978).

Schlanger (1953, 1954) studied the effects of institutionalization on verbalizations of subjects matched on chronological age, mental age, and measured intellectual functioning level. It was found that institutionalization had a negative effect on average sentence length production and number of words per minute. Researchers

concluded that the institutional environment did not facilitate language development since it provided very few opportunities for the clients to use language (Schlanger, 1954; Lyle, 1959, 1960).

Lyle (1961) compared the language of non-institutionalized retardates with that of children of normal intelligence matched for non-verbal IQ and chronological age. Results showed no linguistic retardation beyond what could be predicted from difference in mental age level, but he found that the retardates were approximately five months behind in verbal intelligence.

In another study between normal children and retarded children, Lyle was concerned with the development of language (Lyle, 1961). With both groups of subjects he found the same pattern of language development, but noted that the retarded children were slower in their development.

Mein and O'Connor (1960) studied the oral (expressive) vocabulary of 40 severely retarded individuals. They found that mental age was the greatest predictor of vocabulary size. It was shown that, as mental age increased, vocabulary size increased and paralleled normal acquisition of vocabulary but at a slower rate.

Early studies of retardates attempted to correlate language dysfunction with intelligence. These studies suggested only a moderate degree of relationship between the two variables (Spiker and Irwin, 1949; Gens, 1950; Goertzen, 1957).

Other researchers have stressed the concept of language acquisition dependent on the development of the central nervous system. Lennenberg, Nichols, and Rosenberger (1964) studying retarded Down's

syndrome children, found that the attainment of particular motor milestones was a better predictor of language development than an assessment of intelligence. The child has to reach a certain level of maturation before he can successfully acquire language.

Lackner (1968) conducted an involved study of the language behavior of retarded children. Large language samples were collected and analyzed. The findings indicated that sentence length increased with mental age and compared to the normal for the mental age level. As mental age increased, the order of sentence types was more regular. He found that there was a hierarchy of complexity of the sentence types and that the lower complexity sentences had to be present before a more complex type would appear. Structure rules of the retarded's language were comparable to normal adult usage. These rules were more specific and differentiated as mental age increased.

Lackner's study (1968) also investigated imitation and comprehension of the retarded. He found that, as with normal children, the retarded children could imitate and comprehend sentence types that they were presently using. Therefore, he concluded that the retarded children's form of language behavior was not different from the language of normal children. Both the normal and retarded children have similar language development. He noted that the severely retarded are arrested early in their development and remain at a lower stage of normal development. This concept has been supported by research with the moderately retarded (Fraser, Bellugi, and Brown, 1963; Lovell and Dixon, 1967; Graham and Graham, 1971).

Research indicates that rules of morphology are acquired in the

same way by both normal and retarded children. The major difference was that the retarded learned the rules more slowly (Newfield and Schlanger, 1968). Dever and Gardner (1970) replicated the results of the Newfield study and also noted that the retarded children were able to generalize the morphological rules to their spontaneous conversation.

Although it is recognized that the language development of the retarded follows the normal processes, there are differences in the resulting language and its usage. Studies have shown that even though severely retarded children can apply verbal labels, they require prior discrimination training (Bricker, 1972). Bryant (1965, 1967) observed that the severely retarded can use labels but have problems using the verbal connections spontaneously while they are attending to the objects. Bryant (1975) and Morris (1972) indicated that severely retarded need enforced verbal labeling which increases attention to the stimuli. However, other researchers have suggested that the verbal mediation processes affect language acquisition more than other functions (Luria, 1963; Katz and Rosenberg, 1968).

Recent research has stressed the importance of feedback mechanisms in order to facilitate language. Mahoney (1975) suggested that the severely retarded have a disrupted signaling system (i.e. abnormal crying patterns, delayed smiling) (Schmidt and Erickson, 1972). As a result, the adult speaker is not signaled appropriately and cannot regulate the language model so that the child would be able to comprehend. To overcome this signaling deficit, it may be possible to train the retarded to exhibit the crucial behaviors and to identify

variables that would facilitate information gathering. For progress in developing language facilitation programs, it will be necessary for further research in the characteristics of the retarded child's language development.

Social Behaviors of Severely Retarded

The American Association on Mental Deficiency has defined mental retardation in terms of "subaverage general intellectual functioning which originates during the developmental period and is associated with impairment in adaptive behavior" (Heber, 1961). Adapative behavior is defined in terms of how effective the individual is in adapting to the demands of his environment. Impaired adaptive behavior may be present in maturation, learning, and social adjustment. Social adjustment is measured by how well the individual is able to maintain himself independently in the community and conform to personal and social responsibilities and standards of the community.

Social interaction situations (responding to others, play activities) cannot be engaged in without the previous acquisition of basic language and motor skills (Whitman et al, 1970). In social interactions there is a complex flow of a multitude of behaviors (Koegel, 1974; Morris and Dolker, 1974).

Socialization includes proper responding to others in one's environment. Studies have shown that responding to others depends on the language ability of the person (Lennenberg, 1966). Even if the person does not know how to talk, but has some receptive language skills (answers to his name by looking in the proper direction when

called), he can be taught to attend when called and wave his hand in a motion to indicate hello, or goodbye. In this way, there is a primitive form of interaction taking place (Sloane, Johnston, and Harris, 1968).

Studies have shown evidence that mentally retarded children, autistic children, and brain damaged children who are language delayed, have inoperative or abnormal signaling systems. It was observed that normal crying patterns were almost completely absent, the children usually did not cry for attention or in discomfort (Schaffer, 1971). It was also noted that severely retarded babies did not begin to smile until after six months, whereas babies of average intelligence began smiling prior to five months (Schmidt and Erickson, 1973). This delay or deficiency in early nonverbal communication interferes with the language feedback system which provides language models from the others in the child's environment. It is necessary to develop an effective interaction system based on the child's abilities so that acquisition of language isn't further impeded by an unresponsive environment (McDonald, Blott, Gordon, Spigel, and Hartman, 1974).

Severely retarded individuals appear to imitate, receive, sustain, and terminate social interactions with peers. Observations have not indicated how this was done. Studies indicate that the individuals are using their own communication system to foster their social interactions (Keeran, Grove, and Zachofsky, 1969). The problem is that this system appears to be ineffective in many situations because only the individuals who know the system can effectively use it. Language development may be delayed because there is ineffective interaction

between the severely retarded person and the people in his social environment (Bereiter and Engelman, 1966). To overcome the person's deficiency in communication, it is important that the parents (language models) tailor their responses to the child's level of communicative ability.

Assessment of severely retarded children's skills and abilities is often difficult because of the low level of skills in expressive and receptive communication (Gardner and Giampa, 1971). The degree of socialization attained by the retarded child is a measure of his adaptive behavior. Socialization can represent the retarded person's means of acceptance by the people around him. It is generally acknowledged that socialization involves language (Blount, 1969). Therefore, it is suggested that it is reasonable to hypothesize that language ability may be related to the retarded person's social acceptability and his ability to adapt. Language skills appear to be necessary for social adjustment (Goertzen, 1957).

In studies of deaf retardates, it was observed that training in sign language improved the subjects' ability to communicate and their social responses (Berger, 1971; Hoffmeister and Farmer, 1972). Happ and Lyon (1972) found that peer interactions among the mentally retarded improved through communication training programs. It was observed by researchers that the frequency of socially acceptable behavior of the severely mentally retarded children who were trained in signing and whose parents were instructed in total communication techniques, significantly increased (Grinnell, Detamore, and Lippke, 1976).

Bijou and Baer (1965) stated a social contingency is implicit in development. Thus verbal development is both a product of social interactions and a producer of equipment which enables the person to engage in more social behavior. Recently, there have been developments in measurement devices which are more comprehensive as adaptive behavior scales (Balthazar, 1971; Nirhira, Foster, Shellhaas, and Leland, 1969, 1975).

Most often, social behavior has been related to the attainment of self-help skills. Traditional instruments are the Vineland Social Maturity Scale (Doll, 1965) and the Caine-Levine Social Competence Scale (Levine, Elzey, and Paulson, 1966). These measures give a limited view of the person because the focus is on developmental skills rather than social interaction skills. A study of the Vineland Social Maturity Scale investigating the longitudinal changes in intellectual and social functioning in non-institutionalized retardates, indicated that chronological age accounted for the changes in functioning. Barclay (1969) concluded that the scale was not sensitive enough to reveal variables other than developmental skills.

Congdon (1969) compared the Vineland Social Maturity Scale and the Caine-Levine Competency Scale as measures of social competence of trainable retardates. It appears that these instruments may not be generalizable to the severe and profound levels of retardation because the items are not sufficiently delineated at the lower level of ability in the skill areas.

Toward a Definition of Language: Models and Criteria

Language is an organized system of symbols used only by human beings to communicate ideas on an abstract level. Language is a means to share our experiences, to discuss what happened in the past, what is now occurring, and what might take place in the future. Language can be characterized as a medium for the thinking processes. Language is a model designed and used by man to provide a reconstruction of perceived and manipulated reality. Language is involved with representation and awareness (Oleron, 1977).

Roger Brown (1973) offers more technical criteria to define language. Brown states that language is a product of extensive and biological evolution which makes life experiences accumulative. Language has three properties which emerge when the child begins to talk; semanticity; productivity; and displacement. Semanticity is the ability to symbolize objects or attributes of experience. Productivity is the ability to creatively and lawfully organize these symbols in an infinite number of messages. Displacement is the ability to retrieve experiences at a later date.

There are five stages of development from the child's first utterances. When the child produces his first utterances, he is at the sensory motor stage and does not perceive space or objects connected to purposeful manipulation. The child's first combinations of utterances serve to establish the relationship of the possessed to characterize the events in his life. Brown (1973) maintains that there is word order apparent in the structural meaning that was suggested by the non-linguistic situation. Through his combinations the

child intends to convey these relationships.

Language development is a process by which the child's communications are displaced from the immediate context. The child develops a hierarchical sentence structure. This hierarchy consists of five stages; semantic roles and syntactic meaning grammatical morphemes and modulation of meaning; modalities of simple sentences; embedding; and coordination of simple sentences and propositional relations. Early utterances are short in length and are used to convey the relations of the sensory motor world. Gradually, the child talks because he sees a utility in what he says. Language is improved by response to social pressure. Then there is an acceleration and the child's vocabulary expands and the complexity of this sentence increases (Brown, 1973).

Bellugi and Bronowski (1970) researched the meaning of word order and relations which are intrinsic to the structure of language. They described five steps in the evolution of language; delay between the arrival of the stimulus and the utterance; separation of affect from content; prolongation of the referent; internalization of language as an instrument of reflection and exploration; and reconstitution (procedure of analysis and synthesis by which the mind replicates nature). The child shifts language through increasingly precise categories. His analysis and synthesis is based on the ability to analyze objects into parts and as concepts can manipulate and stand back from the present moment, reconstituting reality into symbolic terms.

It has been stated that language is important to development (Bruner, Olver, and Greenfield, 1966). In the past, many longitudinal

studies in child development based on observation were conducted. Results indicated that the specific skill (language) which evolves concomitantly with the development of other abilities is responsible for those other abilities. Sudden progress in performance of skills is attributed to the acquisition of language (Boutan, 1914; Kellogg and Kellogg, 1933; Bruner, 1964). This research has led to an error in interpretation of the results, a relation based on the temporal succession is interpreted as causally determined (Oleron, 1977).

Correlational methods have indicated that language acquisition is more rapidly developed in children with high IQ's and if children have low IQ's it has been observed that language acquisition is retarded (Leroy-Bousson, 1971). Continued research on individual differences has shown significant correlations between language and measures of development. However, these findings are ambiguous because language development may be the result of attaining certain developmental skills or the skills may be a function of the level of linguistic development. Such studies do not contribute to the determination of the role of language in the development or in the exercise of nonverbal activities, rather they emphasize only the interaction of verbal performance and intellectual development which is only one aspect of the complex relationship between language and mental functioning. It appears that research must go beyond observation to the empirical consideration of the developmental processes in order to study the interactions of the relevant variables.

In order to study the diverse domains involved in development, Oleron (1961, 1972) has proposed a system of intellectual activities

which can be explained in terms of the operation construction. Intellectual development is the acquisition of capacities which enables the person to respond in a situation and to use intermediary steps between the perception and the response. Models provide hypothetical systems of the representation of perceptual and behavioral realities. There are rules of internal organization which provides a framework for one's behavior. Intellectual development is the acquisition of increasingly more precise and elaborate models. This system can be used to further define language. Language is a model which enables a person to analyze, to identify, and to consider his experience. Language is an instrument which responds to basic cognitive activity and facilitates its further growth. The relationship between language and development is reciprocal. There have been many other researchers who have contributed to the clarification of the topic of language and development.

Theoretical Approaches to Language Development

Soviet Researchers

According to the Soviet researchers, language is an aggregate of signals which have similar properties to those of physical objects. Language in this sense, is a secondary signal system (Pavlov, 1932). They propose that in language one finds the reality of thought.

Vygotski (1962) hypothesized that language is a form of tension reduction and an instrument of thought which allows the person to find and develop solutions to problems. The major purpose of language is communication and social contact. For the child, the earliest forms of language are social, followed by problem solving. Other researchers

have demonstrated Vygotski's basic premise in the studies of performance and verbal productivity (Beaudichon and Melot, 1970).

Luria focused his research on the cognitive aspect of language and stressed the influence of cultural processes on man's behavior. It is language which allows man to participate in experiences (social and historical) that would otherwise be beyond his personal reality (Luria and Yudovich, 1959). The child begins to imitate the naming of objects in his environment which has been modeled by the mother. As the child matures, he names the objects and has more control of his own perceptions, behavior, and attention. His speech changes from external verbalizations to primarily internalized subvocal speech. In this process, the child is developing memory and voluntary behavior (Luria, 1961). Luria further hypothesizes that language supports perceptual categories which are translated into words. Thus, language provides links between perceived stimuli and responses which provide great flexibility since the connection can easily be replaced by another language connection (Luria, 1957).

Some later studies have demonstrated results which follow Luria's hypotheses (Lovaas, 1964; Meichenbaum, Keeney, et al, 1967; Hunt, 1969; Goodman, 1969). The difficulty has been in empirically determining whether the processes involve language. Miller, Shelton, and Flavell (1970) designed a study closely following Luria's method and were unable to show facilitative effects of verbal intervention.

Behaviorists

Behaviorists have stressed the importance of the relationship

between language and thought. According to Watson (1930) language development is learned. Watson's model of language presents language as the "linking of stimuli responses and stimuli produced by responses into series" (Watson, 1958, p. 226). He hypothesized connections among motoric, verbal, and visual responses to an external stimulus. Language contributes to man's behavior as both a receptive and a responsive system.

Dollard and Miller (1950) based their views of language on Watson's concepts. They state that language is a set of "response producing indices which are important in thought and reasoning and the practice of using those indices". Language provides mediator responses to stimulations which set a chain of responses through associative pathways in the person's behavior repertoire. If the child only responds in terms of instinct or learned stimulus-response connections, he has a mediational deficit; unable to form his own responses (Reese, 1962; Flavell, 1970; Kendler, 1972). The basic criticism of this theory is that it is an inadequate description of complex response hierarchies and that the empirical data to support this model is weak (Oleron, 1967).

Several learning theorists have proposed a model of language (Osgood, 1953; Mowrer, 1954; Skinner, 1957; Staats, 1968, 1971). Learning theorists state that language and intelligence are closely related domains of skills which are developed through learning. It is hypothesized that the child first learns many repertoires of behavior. Language is seen as one of the more important skill areas. Behavioristic theorists take a deterministic position to find

elementary, causal laws. The orientation is to delineate how the environment affects the language development. The learning of the language repertoires involves basic principles of conditioning and an interaction learning approach. In other words, language learning is a determining factor in how the child will learn and adjust in later situations. This learning theory approach has provided significant information about the parent-child speech interaction which had been negated by researchers of other theoretical backgrounds (Drach, 1969; Kobashigawa, 1969; Pfuderer, 1969).

Skinner (1957) states that language is learned through operant conditioning. The verbal sounds that an infant makes, are reinforced by his parents. As the child grows older, he learns to imitate his parents' speech as the parents train the child by naming objects or events as the child is involved with them. The child receives primary and secondary reinforcement for this verbalization. Such training experiences are presented which are not too complex for the child's stage of development. Gradually, the training is increased in accordance with the child's attainment of more complex behavioral repertoires.

It is hypothesized that the vocal musculature is under operant control which extended man's scope of the social environment via language. Skinner (1974) conceives language as composed of tools as compared to verbal behavior which is reinforced by its effect on people. Language is free of spatial, temporal, and mechanical relations which operate between behavior and nonsocial consequences. How a person speaks depends on social practices which have varying contingencies;

speech is shaped and maintained through the community. Verbal behavior requires no environmental support. Meaning is a property of the contingencies responsible for behavior and control exerted by the stimuli. Referents are aspects of the environment which exert control over responses of which it is linked by reinforcement practices of the verbal community. Verbal responses are symbols of the situation. A major criticism of Skinner's model is that it analyzes only the surface of language (Chomsky, 1967).

More recently, behavioristic researchers have modified their position from the more radical Skinnerian methodology in the study of language. This approach utilizes a learning theory analyses of linguistic data. The purpose of these experimental naturalistic and laboratory studies has been to generate hypotheses of learning causation in language development (Guess, 1969; Sailor, 1971; See Chapter II: Acquisition Strategies of Language in Relation to Development and Learning).

Cognitivists

In contrast to behaviorism, cognitive theory infers mentalistic (or cognitive) processes to describe language (Brown and Fraser, 1963). Chomsky, a leading proponent of the psycholinguistic theory of language development, is primarily concerned with language behavior and the mental processes which are inferred from the observation of that behavior. Grammar and phonology of language are isolated and studied in order to describe language development. Chomsky states his findings in his theory of generative transformational grammar to explain "the

intrinsic association of phonetic form and semantic content in a particular language" (Chomsky, 1967, p. 407). He maintains that the learning theorists' explanation of imitation and reinforcement does not describe the acquisition of language.

Chomsky states there is an innate mechanism, involving neuromuscular changes and maturation, especially cerebral dominance and laterality of function of the brain, which is indicated by the universality of sounds in languages and usage of words. This raises the question of whether language is present in both hemispheres of the brain whereas the speech mechanism is in one, or if language is lateralized to the same degree as the speech mechanism. A series of psychological tests indicated that language can exist in both hemispheres, but the ability to communicate is limited to the left hemisphere (Gazzaniga, 1970). Other research has also shown that infants with left hemispheric brain damage seem to develop language with the right hemisphere (Mussen et al, 1974).

Chomsky maintains that the acquisition of language isn't simply acquiring a repertoire of sentences, but a rule system which makes it possible to generate an infinite variety of original sentences. His structural-physiological approach stresses the primacy of deep structures (syntax-grammar) which is common to all languages. A child extracts from the speech that he hears, a set of rules for construction which may be known only in use. A major problem with this approach is that it loses sight of the communication aspect (semantics) and is a structural exercise which does not account for the function of the evolutional necessity of speech (Chomsky, 1963).

Neopsycholinguists

Recently, psycholinguistic researchers have decided that not all the important areas of language were identified by the former method of study. As Ervin-Tripp (1971) has indicated, learning analysis had valuable suggestions for the cognitive approach to language development. The Chomskian analysis shows that change has occurred but not how change has occurred. Another psycholinguist, Slobin, stated that language is learned in relation to the child's stage of cognitive development (Slobin, 1973).

It appears that there is a gradual change from the radical behavioristic and cognitive positions. The neopsycholinguistic position is an attempt to follow the intent of the original psycholinguistic movement. The purpose is to combine linguistics, information progressing, and learning theory. Currently, the neopsycholinguists are trying to deal with the basic differences in the approaches and use the principles of the opposing position that will add to the state of the field in the study of language.

Morse (1974) follows a Chomskian model of speech perception. He studies the effects of variables of mental and conceptual age and chronological age on speech. Though a cognitive approach, this model states that learning, rather than biological causes, develops linguistic perceptual skills.

In a study by Clark (1974), she states that the child initially responds to isolated features of an object and gradually increases his awareness of the perceptual attributes of a given object. It is hypothesized that the child gradually learns the adult meanings of

words as his cognitive development expands.

Schlesinger takes into account the Chomskian relational concepts of linguistics but stresses the labeling training which is very important if the child is to learn the grammar. He states that the child must learn these concepts which are "dependent on his general cognitive development and not on any innate syntactic concepts" (Schlesinger, 1974).

Menyuk presents a cognitive approach to language that includes a learning theory context for acquisition. She states that the stages in language development are "a product of the child's biological maturation, his changing communication needs, and his ability to relate these needs to particular aspects in the language" (Menyuk, 1974).

The information processing model of language describes the abstraction of meaning from physical signals (speech sounds). This process requires a series of transformations beginning with the acoustic signal and ending with the meaning in the mind of the listener. The language processing is a sequence of internal operations which occur between the stimulus and the meaning. At each particular stage of the operation, information is transformed and passed on to the next stage of the processing. Structural components describe the information available at a specific stage and a functional component describes the operations of the stages (Massaro, 1978).

Semanticists

The semanticists maintain a cognitive concept of language

development and stress the importance of the meaning and communicative intent of the child's verbalizations. This approach hypothesizes that language is a behavior built on the interaction of the child's cognitive and social/affective domains. To develop language, it is necessary that the child has knowledge of this environment which has been related into concepts. It is necessary that these concepts be matched to something that is real and functional in his environment. It is important that the child finds language (human interaction in symbolic terms) is useful and meaningful to him. The child is characterized as an active learner in this interactive process with the non-linguistic and linguistic components of his environment (Bloom, 1970; Brown, 1973).

Social Learning Theorists

Bandura and Harris (1967) have developed a social learning theory of language development. They state that imitation is the main factor in language acquisition. Children attempt to approximate the sounds they hear from adults (social stimuli). Often this imitation is from observation and elicited without reinforcement. For language to develop, it is necessary to establish a communication system between the child and a model. Initially, nonverbal signals (MacNamara, 1972) are used by the preverbal child to express his needs and emotion to his caretaker (Bell and Ainsworth, 1972; Bowlby, 1969). Gradually through modification and reinforcement, these more primitive methods of sustaining interaction develop into more complex, non-social purposes.

Critics of this theory do not question the importance of social

interaction in language development, but maintain that this explanation does not account for the high rate of acquisition, the complex development of grammar, and the instances of the child's creativity in language (Chomsky, 1959; McNeill, 1970).

Piagetians

In his earlier writings, Piaget (1924) equated language with thought. However, in later studies he modified this position and stated, "Language is a necessary but not sufficient condition for the construction of logical operations" (Piaget, 1964, p. 113). This assumption is based on research which demonstrated that operational thought develops from activity. The sensorimotor mechanisms and action provides the basis for the structures of thought rather than linguistic functioning. As the structures of thought become increasingly more complex, language has an increasingly more important role in the elaboration of thought. He hypothesizes a circular interaction or genetic link between language and thought. Language does not cause cognitive operations; they develop independently (Inhelder and Piaget, 1964; Sinclair-de-Zwart, 1969). This later position supports the priority of intelligence over language.

Language, as other areas of development, follows a series of regulations and equilibrations. The child develops in his first few months (sensorimotor stage) an organization of schemata which help him to adapt to his environment. Just as there is reciprocal assimilation of schemata in the coordination of vision and grasping; so too is it in the coordination of practical and verbal schemata. In other

words, there are verbal schemata developed early in the sensorimotor period that influence perception and behavior (Piaget and Inhelder, 1968).

Piaget states that in language development representational thought does not begin with the result from the incorporation of verbal signs from the social environment. The nonverbal symbols which emerge toward the end of the sensorimotor development are the first signifiers. Symbolic function is a general and basic acquisition which makes the acquisition of social signs possible. A codified and socially shared linguistic system is essential in the development of conceptual thinking. Thought could never become socialized or logical without the symbolization of language (Flavell, 1963).

Cruickshank's system of language development is similar to that of Piaget's. Language is divided into inner, receptive, and expressive language. Inner language is the symbol system of associations between words and concrete experiences. It is important to form these associations before words can be understood. After these associations are made to a certain degree, receptive language begins to develop. It is then necessary for receptive language to become established as a symbol system to understand others. After receptive language has been accomplished, expressive language is possible. Expressive language is the system one uses to communicate his ideas to others (Cruickshank, 1961).

Other researchers following the Piagetian framework have noted that the ability to represent one thing with another is one of the basic cognitive prerequisites for language development (Morehead and

Ingram, 1973). Mehrabian and Williams (1971) designed a cognitive developmental scale to identify and assess the preverbal skills related to representation in order to plan language programs.

There has been experimental research investigating and supporting Piaget's hypotheses of language development. Sinclair-de-Zwart's study (1969) presents evidence that advances in cognitive structures when the first concrete operations of conservation of liquids and seriation develop, they are paralleled by advances in language development of syntactic structures and use of certain lexical items. Greenfield, Nelson, and Saltzman (1972) show a direct formal parallel between action and grammar. They argue that both are behavioral indications of internal forms of organization.

Piaget's epistemological perspective of language development has been criticized for the lack of experimental studies and the contradictions concerning language's role in development. There are questions about the Piagetian position in comparing cognitive and verbal development. It is necessary to accept the basic hypothesis that there is a progression of stages moving from dependence on immediate perceptions and action as crucial to his theory of development in all areas.

Acquisition Strategies of Language in Relation to Development and Learning

In discussing programs for the language development of the severely retarded, it is necessary to consider the interaction of behavior and cognitive processes which affect the way the child will

learn and use language. An acquisition strategy of language development outlines the framework for teaching and learning language. The strategies to be discussed have been developed primarily according to a learning theory position.

Oral Communication Methods of Language Development

Methods of language development using an oral communication approach direct training to establish or improve verbal behavior as discriminated verbal responses. The child is trained to verbally imitate verbal presentations. After this is established, training is concentrated on teaching functional and spontaneous speech across a variety of environments, persons, and materials.

Reinforcement principles have been shown to be very effective in the speech training of retarded children (MacAuley, 1968; McReynolds, 1969; Sloane, Johnston, and Harris, 1968). A number of studies have been conducted with institutionalized nonverbal, severely retarded children (Hollis and Sherman, 1967). Results have indicated the operant characteristics of vocal behavior. It was demonstrated that a fixed-interval schedule of primary reinforcement was effective in shaping vocalizations.

Studies in normal child development indicate that before the child verbalizes productive speech, he must first be under the stimulus control of words; have receptive language skills (Gesell and Thompson, 1934; Baron, Kaufman, and Stauber, 1969). Research with retarded children has been conducted to determine the role of receptive language and how it is established (Baer et al, 1967; Zimmerman, Zimmerman, and

Russell, 1969; Whitman, Zakaras, and Chardos, 1971). Results indicate that response generalization of receptive language can be established and maintained through reinforcement procedures. If there is poor generalization from receptive language, the retarded child will have difficulty in developing expressive language (Guess, 1969).

One of the main premises of oral communication training programs is that sounds and words are acquired by the child through hearing speech and mimicking the sounds of others. Most likely the verbal imitations are selectively reinforced which develops into a complex repertoire of verbal behavior. Vocal imitation training is a prerequisite step in training the language deficient child.

In some studies, imitation skills were developed by first training motor imitation skills before the vocal imitation skills (Hewett, 1965). The child is physically assisted to imitate the model and is reinforced. Gradually, the prompts are removed and closer approximations to the model are reinforced until the response matches the model (Risley and Baer, 1973). In a study with nonverbal, nonimitative severely retarded children, Baer, Peterson, and Sherman (1967) noted that as the children were trained to imitate certain motor responses, they also began to imitate other nontrained responses. This study and others suggest that there is a generalized imitation skill which once is developed can be used to establish vocal imitations (Metz, 1965; Bricker and Bricker, 1966). In another study with severely retarded children, the motor responses to be imitated were mouth and tongue movements. Once the child was able to imitate these movements, the training combined vocal sounds by which vocal imitation was established

in all subjects (Sloane, Johnston, and Harris, 1968).

Other language programs using only vocal imitation training have also been successful. The technique involved reinforcing vocal sounds and bringing the vocalizations under the imitative control of the trainer (Kerr, Myerson, and Michael, 1965; Risley and Wolf, 1967). A study (Schroeder and Baer, 1972) of training vocal imitation in retarded children indicated concurrent training (presentation and training more than one item at a time) produces better generalization accuracy than serial training.

After vocal imitation has been established, the next step is to train functional speech by developing a labeling vocabulary (Risley and Wolf, 1967; Sloane et al, 1968; Touchette, 1971). Severely retarded children were trained to imitate the labeling model and then the model was gradually faded until no prompt was needed.

Lovaas (1968) used a procedure of formation of general concepts to develop functional speech after vocal imitation training. Nonverbal children were trained to respond to different classes of objects; to receptively and expressively use basic prepositions and pronouns; and to respond in both trained and untrained situations. Results indicated that initial verbalizations require more training time. Anecdotal reports suggest there is a generalized use of speech in non-training settings (Risley and Wolf, 1967; Sloane et al, 1968).

Later studies by Lovaas (Lovaas, Schreibman, Koegel, and Rehm, 1973, 1977; Lovaas, 1977) indicated that the visual discrimination of autistic children was below normal when a complex stimulus was presented. The conclusion was that there is an overselectivity or

focusing on one part of the stimulus while ignoring other aspects which interferes with the perception. During discrimination training, it appears that the autistic child will select irrelevant features and use that to govern his response. This selection is independent of the stimulus modality. If the child follows a stimulus hierarchy then the educator could train another modality without the presentation of the preferred stimulus to reduce the preference (i.e. a child prefers the visual modality so, the educator could train auditory stimuli without the presence of the visual). Lovaas also suggests a successful intervention procedure is to use contingent aversive stimuli (Lovaas, 1977).

More complex verbal responses can be trained through modeling, fading, and differential reinforcement, as demonstrated in several studies. Wheeler and Sulzer (1970) used operant training techniques to train a nonverbal child to use complete sentences and to use generative rules of syntax in nontrained situations. Garcia, Guess, and Brynes (1973) also used operant techniques to establish and control simple syntactical usage.

In developing a language training program for severely retarded children, it is important to consider the normal developmental pattern of language acquisition. Miller and Yoder (1974) maintain that a developmental approach increases the probability of the child learning usage above what was programmed by presenting training in increasing degrees of complexity. In this way the learning process is maximized by developing prerequisite skills to facilitate later progress in the acquisition processes (Bowerman, 1974; Cromer, 1974).

Other researchers state that a developmental approach is not relevant for teaching the mentally retarded. Guess, Sailor, and Baer (1974) have pointed out that the retarded child is not at the same developmental level as a normal mental age peer because the retarded child is older. An intervention program would be needed to provide the experiences and events to bridge the gap.

Another issue in developing strategies of language acquisition for the retarded is if the language goals of the program should be 'normal' language usage or limited usage. Most researchers agreed that some language is better than none and that studies should be conducted to determine program components that will facilitate language development (Ruder and Smith, 1974).

Special educators have designed various language curricula for the mentally retarded. Though successful in varying degrees, there are deficiencies in the designs. It is necessary to define:

1. the function of training motor imitation before vocal imitation;

2. the function of shaping, fading, and chaining during imitation development and speech acquisition;

3. the training techniques;

4. the properties of speech development (Garcia and DeHaven, 1974).

For the language programs to be more effective, an evaluation of the type of learner and his natural environment is needed. The programs should be geared to maximize the transfer of skills which are trained to those not trained if there is to be productive use of language

skills. Consideration should be given to the most effective content goals based on the individual's needs and abilities.

Program developers are faced with many unanswered questions. Further research, comparative studies, and a clarification of goals are feasible and necessary to provide a comprehensive model of language training for the mentally retarded.

Non-Oral Communication Methods of Language Development

Though there has been progress in the attempts to develop language programs to train speech usage and improve oral communication skills of the severely retarded, there are still many problems and areas of deficiencies. Schaffer and Goehl (1974) have identified the characteristics of a child who has not responded to oral communication methods. The alinguistic child typically functions in the severe range of retardation; has not progressed in regular speech programs; has not exhibited functional receptive or expressive language (there may be handicaps such as deafness, emotional disturbance, etc. which have interferred with language development); and shows an ability to gesture.

An alternative to the oral mode of communication is a non-speech system (Larson, 1971; Levett, 1969, 1971; Bricker, 1972; Moores, 1973). Non-speech systems include visual language systems; Manual English; Signed English; and Simultaneous Communication or Total Communication. Manual communication systems are characterized by the ikonicity of the signs used; the motoric enactment of the signs; and the use of spatial dimensions (Moores, 1973). It appears that the signs are easily

interpreted. These systems promote understandability and enables communication for those who are unable to express themselves through the vocal-phonological mechanisms. Though in the past much of the research with manual communication has been implemented with the deaf and deaf-blind populations, results have been applied to language training programs for the mentally retarded. As with the deaf population, there have been positive results with the use of manual communication for the severely retarded. Manual communication has been shown to be effective for language deficient people.

Visual Language Systems

Premack and Premack (1973) devised a plastic sign system to represent objects and words in order to train autistic children and chimpanzees to acquire both receptive and expressive language. Plastic shapes were paired to real objects to train words; referents; and word-referent associations. Both the chimp and the child learned a vocabulary of over 100 words (nouns, verbs, adjectives, particles, prepositions, and connectives); to comprehend simple (one compound and one complex) sentences and questions by the end of their training. Based on a functional analysis of language, the subject is taught specific tasks which can be extended into more complex behavior.

Carrier (1974) has adapted Premacks' system of use of plastic forms to train noun usage by severely retarded children. In a study of 62 severely or profoundly retarded nonverbal children, ages seven to sixteen years, training was initiated in imitation of the motor behavior of picking up and placing a geometric form on a tray. Through

modeling and extensive shaping techniques, the subjects were taught to perform the behavior only when a picture stimulus was presented. The criterion was to respond correctly with a different form to each of then pictures with 100% accuracy. The training time varied between thirty minutes and four hours; the mean time was two hours and five minutes. Though noun usage is only one component of a complete language system, these results do indicate that the severely retarded are capable of learning word-usage skills which could be transferred to more complex language functions. This system is based on a logical rather than development analysis of language and presents the forms in a grammatical context. The major difficulty with this system is the artificiality. However, it is believed that transfer to natural language is possible and that the plastic visual system is better than no communication at all.

The Bliss symbol is another alternate communication system which has been used with nonvocal, motorically impaired, mentally handicapped persons. Bliss symbols are idiographic and pictorgraphic symbols which are displayed with the corresponding word on a communication board. This system involves teaching a student to use a picture-symbol vocabulary in order to communicate. The program consists of introducing the symbol; modeling of pointing responses to the symbol paired with verbal identification of the symbol concept; prompting of pointing response; symbol discrimination exercises; use of symbols for respondent communication; and symbol pointing for expressive communication (Vanderheiden, 1975).

Manual English System

Manual English is a variant of manual communication. There is a one-to-one correspondence of the manual alphabet to the traditional English alphabet. Words are presented by fingerspelling. This is a formal linguistic system which follows the rules of formal English. Though this method is used successfully with the deaf, there has not been productive application for the severely mentally retarded population due to the complexity of the mode of presentation (Moores, 1973).

Signed English

In Signed English, words and concepts are presented by a sign denoting a complete idea. Sign language employs abstract linguistic and semantic principles just as the English language does. The difference is that the system is encoded via a gestural-visual modality rather than an auditory-vocal modality (Klima and Bellugi, 1972). The nonverbal retarded person appears to learn the visual signs more easily than vocal signs (Topper, 1973; Schaffer and Goehl, 1974). However, there is an argument among theorists that response to and use of signs does not necessarily constitute the acquisition of a linguistic communication system. Chomsky (1968), Brown (1972), and Klima and Bellugi (1972) maintain that for a person (or chimpanzee, etc.) to have a linguistic system, he must understand the underlying grammatic structures; whereas the Gardners (1969) and Berger (1971) claim that a repertoire of functional word-associated signs meet the requirements of a language system.

Total Communication

Total Communication is a combination of American Sign Language

and oral speech (Stokoe, 1970). It is a multi-modality method of presentation utilizing the tactile, auditory, visual, and oral sensory channels. Signs are paired with speech to train the person to develop a functional language system by which he can communicate with others (Haight, 1977). In working with severely retarded children, it is difficult to find the most effective channel of communication. Total communication maximizes the stimuli by allowing the child to hear the word, see the word pantomimed, see the lip movements and facial expressions, and feel the tactile symbols. This approach is versatile and takes into account the individual's impaired learning patterns (Donlon and Burton, 1976).

Traditional operant techniques, modeling; imitation; physical prompting; shaping; fading; and reinforcement, are used to develop signing responses in a total communication program for the nonverbal severely retarded individual (Hopper and Wambold, 1977). Baselining is done in order to monitor the rate of acquisition. Typically, in order to maximize the stimulus input, the sign is paired not only with the verbal cue but also the relevant event occurring in the natural setting that it would usually happen (Lebels and Lebels, 1975; Topper, 1975). Since shaping and successive approximations are utilized, the degree of proficiency and replication will depend on the individual's motoric abilities and also the complexity of the sign (Grinnell et al, 1976; Mayberry, 1976).

This simultaneous presentation has been used effectively with severely retarded children to develop extensive receptive and expressive signing vocabularies (Helmick and Hopper, 1975). Wolf and Rynder

(1975) noted that language programs which incorporate nonverbal responses are effective in facilitating language acquisition for the preschool age retarded child. A pilot study by Wolf and McAlonie (1977) utilized the Minnesota Early Language Development Sequence (Clark, Moores, and Woodcock, 1975) which combines sign language, rebuses, and oral presentation to train nonverbal, retarded, hearing preschool children. After twenty weeks of training, all the children made gains in receptive language development. Four children showed gains in expressive language through both signing and verbalizations. In other studies with severely retarded children, it was indicated that a nonspeech response system facilitates acquisition of language skills (Hollis and Carrier, 1975).

Gesture language appears to be natural in initiating communication (Mavilya, 1978). However, many times the individual may use esoteric gestures which have no meaning for others. In order to make total communication useful for the severely retarded, it is important to consistently stimulate and reinforce the use of sign language (Kopchick, Rombach, and Smilovitz, 1975).

Before a total communication program is initiated the teacher should consider the child's chronological and developmental age; the degree of previous success in speech therapy programs; the effectiveness of the child's present communication ability; and the support of the parents and the school staff. Once the program is initiated, the vocabulary items should be chosen to fit the individual needs of the students. Items should be selected that will be used frequently; are functional; can be integrated into the total educational program; and

have inherent reinforcement value (Hopper and Wambold, 1977).

Total communication programs are often criticized as inhibiting verbalizations and confusing language input (Lloyd, 1973). Studies of severely retarded nonverbal children showed improvement between pre- and posttest articulation measures and increases in verbalizations after training in a total communication program (Oxman, Konstantareas, and Webster, 1976). These findings have been supported by other researchers (Creedon, 1973; Grinnell, Detamore, and Lippke, 1976). There are indications that simultaneous communication programs improve proficiency in articulation, speech comprehension, and increased verbalizations (Miller and Miller, 1973).

There is a need for more experimental research of methods of presentation; multimodal input; acquisition rates; and the generative aspects of sign language with the severely handicapped. Results of studies with a significant sample size are needed in order to develop the most facilitative procedures and techniques given the relationship of the severely retarded learner variables and the task variables involved in language acquisition (Hopper and Helmick, 1977).

Recapitulation

Definitions of mental retardation have been re-examined in order to deal with the practical and theoretical issues involved in establishing educational programs for the severely retarded population. Research has shown that there is not a difference in the learning of a retarded person from the learning of a person of 'normal' intelligence of the same mental age. It is the person's intellectual developmental level

which affects the level of learning. Researchers have noted that learning rate appears to be controlled by attending sets, motivation, and cognitive structures.

As with learning, the language behavior of retarded children is not different from the language of normal children. Language development is similar, though the severely retarded remain at a lower developmental stage which does result in differences in language and its usage.

Studies have shown that socialization is related to one's language ability. There is evidence that the language delays and deficiencies of severely retarded individuals interfere with developing an effective social interaction system.

The establishment of functional communication in severely retarded children is one of the major objectives in providing an education for the retarded. This objective is to develop useful and appropriate communication to enable the individual to achieve his maximum potential. The design of a language program involves theory of language development and language learning theory. The pattern of a language program for the retarded should follow the normal language development pattern. (Hallet, Snype, and Gates, 1971) The elements of normal language development must be elaborated to meet the needs of educating the severely mentally retarded.

Communication skills are essential for the linguistic, cognitive, and social development of an individual. Communication skills vary with the functional level of the person. The severely retarded person's communication skills are hampered by his limited behavioral repertoire

(i.e. does not turn head to sound source; does not show interest in environment by neither looking or reaching for objects). The individual's deficient communication skills further impair the learning process.

Often the nonverbal person is frustrated by attempts to produce oral communications. It appears that there would be a value in developing augmentative systems of communication. Total (simultaneous) communication is one of the several systems available for use with the severely retarded population. Simultaneous communication involves conceiving, encoding, and speaking English at the same time the speaker uses Signed English (Stokoe, 1970). The verbal and visual input has been reported as effective in the development of extensive signing vocabularies. Studies have indicated that the multimodal input (situational, facial, auditory, and body cues) parallels the normal oral exchange. It has also been shown that this system of language training may maximize the probability of developing communication skills (Helmick and Hopper, 1975). Other research has indicated that total communication can facilitate verbalization in the nonverbal person (Hopper and Wambold, 1977; Lebels and Lebels, 1975; Oxman, Konstantareas, and Webster, 1976; Skelly, Schinsky, Smith, and Fust, 1974; Topper, 1975; Creedon, 1973; Grinnell, Detamore, and Lippke, 1976; Miller and Miller, 1973). Continued research of language systems for the training of the nonverbal severely retarded is necessary. Effective instructional strategies must be developed to enable the severely handicapped person to communicate more effectively and function more independently.

CHAPTER III

METHOD

Statement of Hypotheses

In the present study, the following research hypotheses were investigated:

1-10. A Total Communication method of language training (speech signals and formal gestures presented simultaneously) will result in greater gains in language development scores for the severely retarded than an Oral Communication method of language training (vocalization; word imitation; receptive vocabulary; and expressive vocabulary). The Gesell Developmental Schedules (language score), the Fairview Language Evaluation Scale (language age; language level; language quotient), and the Receptive-Expressive-Emergent-Language Scale (receptive age; expressive age; combined age; receptive quotient; expressive quotient; and language quotient) served as the dependent variables.

11-12. A Total Communication method will result in improved scores in social skill abilities than an Oral Communication method of language training. The American Association on Mental Deficiency Adaptive Behavior Scales (Part One and Part Two) was the dependent variable.

13. There is an inverse relationship between chronological age and the rate of acquisition of signs and/or oral vocabulary. This was measured by the Gesell Developmental Schedules (language score), the Fairview Language Evaluation Scale (language age; language level;

language quotient), and the Receptive-Expressive-Emergent-Language Scale (receptive age; expressive age; combined age; receptive quotient; expressive quotient; language quotient).

14. There is a positive relationship between language ability as measured by the Fairview Language Evaluation Scale and the Receptive-Expressive-Emergent-Language Scale.

15. There is a positive relationship between language ability (measured by the Fairview Language Evaluation Scale and the Receptive-Expressive-Emergent-Language Scale) and social skill ability (measured by the AAMD Adaptive Behavior Scale: Part One).

16. There is an inverse relationship between language ability (measured by the Fairview Language Evaluation Scale and the Receptive-Expressive-Emergent-Language Scale) and social skill ability (measured by the AAMD Adaptive Behavior Scale: Part Two).

17. There is a positive relationship between social skill ability as measured by the AAMD Adaptive Behavior Scale: Part One and a rating by judges of functional level.

18. There is an inverse relationship between social skill ability as measured by the AAMD Adaptive Behavior Scale: Part Two and a rating by judges of functional level.

Subjects

Two groups of severely mentally retarded nonverbal children ages three to eighteen of both sexes were selected as subjects. They were students enrolled in a full-time day school program of the Chicago Association for Retarded Citizens which is a private, not-for-profit

agency. A release form was signed by the parent for consent for psychological testing and research studies at the time the child was admitted into the CARC program. (See Appendix A)

Seventy subjects (40 boys, 30 girls) were randomly selected from three of nine CARC day school facilities randomly selected. The IQ score of the subjects is between 15-35 (severely retarded range of intelligence). The subjects were grouped according to age into three categories: Pre-School ages 3-7; Intermediate ages 8-12; and Pre-Vocational ages 13-18. Because of school transfer or institutionalization, only 56 subjects (35 boys, 21 girls) remained in the study for the twelve month period. (See Table 1)

The subjects were randomly assigned to one of two treatment groups (a total of 29 subjects, Oral Communication Group; 27 subjects, Total Communication Group). Each treatment group consisted of subjects from each school. All subjects were comparable in their training experience in the school program of CARC. The program at all schools consists of sensory-motor, perceptual-motor, self-help, and language training.

The subjects in this study had no expressive verbal language, had a language development age of less than two years, and had up until the time of the study received the same method of language development training. All subjects had shown little or no jargon, babbling, or low level of intelligible speech in relation to age and abilities in other developmental areas. Records had indicated that there has been lack of progress in developing oral speech.

Table 1

Numerical Distribution of Subjects By Group, Sex, and Age

	Total n	Male	Female	Age
Oral Communication				
Group 1	5	2	3	3-7
2	4	3	1	8-12
3	3	2	1	13-18
4	5	3	2	3-7
5	2	0	2	8-12
6	2	2	0	13-18
7	3	2	1	3-7
8	3	2	1	8-12
9	2	1	1	13-18
Total Communication				
Group 10	6	4	2	3-7
11	4	3	1	8-12
12	2	1	1	13-18
13	3	2	1	3-7
14	2	0	2	8-12
15	2	2	0	13-18
16	3	2	1	3-7
17	2	1	1	8-12
18	3	3	0	13-18

Procedure

The two methods of language development training compared were the Oral Communication Method and Total Communication Method which is a combination of the Oral and Manual techniques of language training. The Oral Communication Method was the control and the Total Communication Method was the experimental treatment.

Each subject was pre-tested using the Gesell Developmental Schedules, the Fairview Language Evaluation Scale, and the Receptive-Expressive-Emergent-Language Scale. After twelve months, all subjects were post-tested with the same measures. In addition, the subjects were assessed on measures of social skills and adaptive behavior. These behaviors were tested by the AAMD Adaptive Behavior Scale and a rated functioning level.

Three speech pathologists administered the treatment language program and oversaw the control language program. Behavioral data sheets were systematically recorded.

Treatment Condition One: Oral Communication Method

This was the language program presently being used in all the CARC schools. Since all 56 subjects were in the CARC program, all continued to receive this treatment. The 29 subjects assigned to this group for this research received no additional language training. Therefore, the subjects in this group served as the control subjects.

The treatment was formal and structured, and consisted of four categories:

1. Pre-Speech: Gross motor activities are used for imitation

training. This is used to develop attending skills, to train both motor and vocal imitation, to train comprehension, and to train the functional use of objects.

The child at this level of preverbal development has no comprehension skills or production skills. The skills which the child will learns at this level are the most basic listening skills, such as learning to attend to the human voice and learning to look at the speaker's face. The child functioning at this level needs an almost constant input of short, simple sentences relating to what he is doing and describing his environment. (See Appendix B)

2. Speech Sound Imitation (Facilitative Babbling): This is a method to develop vocalizations and babbling in nonverbal children using physical movement, verbal modeling, and physical manipulation of the speech mechanism. The child is held on the teacher's lap facing him. The teacher bounces the child up and down and produces simple bilabial babbling sequences (ba-ba-ba; ma-ma-ma; puh-puh) with the child watching the teacher's face.

The child is reinforced through imitating whatever the child says, and smiling, hugging, saying "good talking". Sustained vocalizations are modified into babbling through patting the child's mouth or having him pat the teacher's mouth, and through moving the child's chin as he vocalizes.

Many language theorists believe that an infant must develop pleasurable physical associations with speech or he will not develop the desire to talk. The mother provides this by holding the baby and talking to him, verbalizing to him whenever he makes any sounds. In

this way, the mother's vocalizations alone become a stimulus for the child. Facilitative babbling attempts to provide the same type of reinforcing environment for speech and sound development (Sloane et al, 1968).

For most nonverbal children, facilitative babbling leads to spontaneous vocalization and babbling which can be shaped into simple word imitations. In addition, facilitative babbling appears to sometimes produce improved social skills, such as more smiling, approaching adults more, and less resistance to physical contact. (See Appendix B)

3. Early Word Recognition: The purpose is to teach a limited receptive vocabulary. The child learns to respond differentially by pointing, touching, or finding objects; room parts; body parts. While the child is learning object discrimination, he is also taught to differentially imitate 10-25 basic vocabulary items used in the receptive training. (See Appendix B)

4. Building Expressive Language: The purpose is to teach the components of two types of noun phrases (color+noun; verb+noun). The vocabulary is expanded to 25-50 basic words. (See Appendix B)

Treatment Condition Two: Total Communication Method

Total communication is a means of communication in which speech signals and formal gestures are used to translate information. Total communication is the simultaneous presentation of visual manual language with oral spoken English. This manual language uses signs which are a part of American Sign Language (AMESLAN). There is not a

one-to-one correspondence to oral spoken English (morphemes and articles are not signed) (Fant, 1972).

Although this method was originally developed for the deaf, it was found to be useful with nonverbal, severely retarded children who have appeared to have plateaued in their language development in the early stages of sound imitation. For those students who appear unable to produce or perfect understandable words, it appears beneficial to teach a manual mode of expression along with continued training in oral communication (Bricker, 1972).

The Total Communication method enables the child to communicate with his peers and adults with an expressive system of signs. This method also builds receptive skills which provide a foundation for further learning.

The child is taught to communicate simple words and concepts through signs. The teacher simultaneously communicates with signs and oral spoken English. This method lets the child make auditory associations between the spoken English and the signs.

The treatment was formal and structured and consisted of four categories:

1. Attending: The purpose is to train the child to watch as the teacher presents signs and gives commands. The child is learning the meaning of the basic words and commands receptively. The child is not expected to use the signs expressively. During this time, the child learns a basic core vocabulary of 5-10 signs. (See Appendix C)

2. Motor and Vocal Imitation: The purpose is to train the child to imitate motor movements since success in signing relies on

the child's ability to copy specific signs. Training begins with gross hand and arm movements and works up to finger movements. Oral spoken English is also used to help the child begin to associate the movements and the sounds (the child is reinforced for imitating gross sounds, etc.). As the child learns to receptively understand the signs, two sign phrases are combined. During this period, the core vocabulary is expanded to 10-25 signs. (See Appendix C)

3. Expressive: The purpose is to teach the child to sign responses to answer questions using the signs from the core vocabulary. If the sign is an approximation, the teacher gives an imitative prompt to elicit the correct response. If the signs appear to be difficult for the child more training in motor imitation may be necessary. The core vocabulary is expanded to 25-50 signs. (See Appendix C)

4. Expansion of Expressive Ability: After the child learns one and two sign phrases, he is taught to combine 3-4 word responses. As new words are taught, the old ones are reviewed. (See Appendix C)

Instrumentation

Gesell Developmental Schedules

One of the measures administered to all the subjects was Gesell Developmental Schedules. Gesell and Amatruda (1947) did not claim that this was a test of infant intelligence, rather, the test was regarded as a normative device for appraising the developmental status of young children, beginning at birth. Since they identified mental growth with the maturation of the organism, the schedules were designed to be measures of mental growth.

The schedules are divided into four fields of behavior: motor, adaptive, language, and personal-social. These fields develop interdependently. It is necessary to appraise each field of behavior in order to arrive at an adequate estimate of behavioral development.

The rate of development is expressed on the Developmental Schedules by the Developmental Quotient (DQ) which represents the proportion of normal development present at any given age can be used in each of the four scales (Wilson, 1942). Research using the scales with both normal and retarded children has indicated that it may be possible to predict a child's rate of growth with accuracy (Firestone, 1942). A later study of mentally retarded infants showed that the Gesell was reliable in the prognosis of mental retardation during infancy (Illingworth, 1961).

The "normative" sample used by the Gesell does not appear to be representative as it consisted of 107 white middle class children (Bayley, 1942). Validity was obtained by correlating scores of the Gesell with scores on the Cattell Infant Intelligence Scale. Correlation was .52 (Pease, 1961). The reliability was determined by split-half method with 14 age groups. The correlations ranged from .68-.93 (Linfert and Hierholzer, 1928; Nelson and Richards, 1938).

Fairview Language Evaluation Scale

One language measure that was used is the Fairview Language Evaluation Scale (Boroskin, 1971). This scale was designed for use with the severely and profoundly mentally retarded who are institutionalized. The scale is quantitative and gives a score which

corresponds to a level of language ability. It assesses various levels of verbal and nonverbal language so that a change in ability and production would be easily noted. A language age (LA) and language quotient (LQ) are determined from the testing.

Reliability was determined to be between .84 and .90. Technicians on the ward of the institution evaluated 15 patients each. Three months later, the same group of raters re-evaluated the same patients. The patients were rated by the technicians from the morning and afternoon shifts on the ward. The reliability coefficients appear to be acceptable reliability and stability indices.

Validity was established by determining correlations of language age and mental age. The Fairview was administered to 160 patients at Fairview State Hospital and 52 students at the Greeley School for the trainable retarded. The patients were also given the Kuhlmann-Binet or the Stanford-Binet at the same time as the language evaluation. Intelligence scores for the students were taken from their school records from testing that had been done in the previous six months. The results indicated that there is nearly one-to-one correspondence of language age and mental age with a constant error of four months.

Receptive-Expressive-Emergent-Language Scale

The other language measure that was used is the Receptive-Expressive-Emergent-Language Scale (REEL). The basic rationale of the REEL Scale is that there is a "universal, predictable pattern to receptive and expressive language development during the first 36 months" (Bzoch and League, 1971). The items on the scale were

obtained through a search of the developmental literature. Each item used was reconfirmed through laboratory tests. In the first year of development, there are three items for each month; in the second year, there are three items for each two months, and in the third year, each interval accounts for three months of development. A receptive language quotient (RLQ), an expressive language quotient (ELQ), and a combined language quotient (CLQ) are determined from the testing.

The validity of the scale was demonstrated through three independent studies involving 127 infants and young children free from any known sensory or organic disabilities. After repeated monthly testing over a two to three year period, all infants were found to achieve mean average scores for Receptive, Expressive, and Combined Language Age at or above their chronological ages.

Reliability studies involved the repeated testing of 28 normal infants (who never before participated in any phase of the language research). Test-retest agreement within plus or minus one age interval on the REEL scale was used as the criterion. Agreement between different test administrations ranged from 90% to 100%. After a three week interval, there was a re-examination which yielded an overall Combined Language Quotient (CLQ) correlation value of .71 (Bzoch and League, 1971).

AAMD Adaptive Behavior Scale

The AAMD Adaptive Behavior Scale is a behavior rating scale for the mentally retarded, emotionally maladjusted, and developmentally disabled individuals. It is designed to provide objective descriptions

and evaluations of an individual's adaptive behavior. Adaptive behavior refers to the effectiveness of an individual in coping with the natural and social demands of his or her environment. Part One of the Adaptive Behavior Scale is organized along developmental lines and is designed to evaluate an individual's skills and habits in ten behavior domains (independent functioning, physical development, economic activity, language development, numbers and time, domestic activity, vocational activity, self-direction, responsibility, and socialization) which are considered important to the development of personal independence in daily living. Part Two consists of fourteen behavior domains (violent and destructive behavior, antisocial behavior, rebellious behavior, untrustworthy behavior, withdrawal, stereotyped behavior, inappropriate interpersonal manners, unacceptable vocal habits, unacceptable habits, self abusive behavior, hyperactive tendencies, sexually aberrant behavior, psychological disturbances, and use of medications) of social expectations that would be placed on retarded persons, both in the community or in the institution. This section is designed to provide measures of maladaptive behavior related to personality and behavior disorders (AAMD manual, 1974).

"The AAMD Adaptive Behavior Scale is still being investigated. Currently, there are studies being conducted to assess the ABS with non-institutionalized retarded persons to determine test-retest reliability and longitudinal behavior change under treatment, to compare ratings by different observers under different situations, to carry out typological analyses of individual score patterns, and to provide further factor analyses of the Scale at the item level" (AAMD

manual, 1974, p. 45).

"In order to assess the reliability of the 1974 Adaptive Behavior Scale, it was administered to a total of 133 residents at three state training schools. Each resident was rated independently by two ward technicians (from each the A.M. and P.M. shifts). Reliabilities of Part One domain scores were estimated by Pearson product-moment correlation coefficients between the pairs of independent ratings from two different shifts. The reliabilities ranged from .71-.93. The mean reliability was .86 (the reliability of the original version was .74). The reliability data for Part Two yields a mean of .57. Some of the domains of Part Two have a limited range and are severely positively skewed in their score distributions. These scores were dichotomized and the Phi coefficient was used to estimate the reliability. The reliability in the original version was .67; the reduction may be attributable to population characteristics of the samples, types of raters, situational differences rather than variables of the Scale" (AAMD manual, 1974, p. 46).

"To determine factorial validity, factor analyses of domain scores delineated three major dimensions: Personal Independence, Social Maladaptation, and Personal Maladaptation. Personal independence was defined by the behavior domains that represent the individual's skills and abilities required to maintain his personal independence and by the behavior domains that suggest the presence of autonomy or motivation to manage one's personal affairs. Social maladaptation suggests a general dimension of extrapunitive, antisocial, behavior disorders. Personal maladaptation seems to represent

a dimension of intro-punitive maladaptation. There are slight variations in the nature of these factors between the different maturational stages" (AAMD manual, 1974, p. 48).

Only a few studies have been done to determine practical validity. A study of 41 institutionalized retarded persons, 10-13 years of age, showed that Part One domain scores significantly discriminated between those who had been classified at different levels of adaptive behavior by clinical judgement (AAMD manual, 1974).

"Concurrent validity of the Scale must rest upon what further research reveals regarding its concurrent and prognostic behavioral correlates, and regarding its relationship to other psychological measures" (AAMD manual, 1974, p. 48).

Rated Functioning Level

To determine the rated functioning level of the subjects, the judges rated them according to an estimate of functioning, to estimated IQ and ability to adapt to the environment along a 1 (poorest) to 5 (best) scale.

A total of nine judges (3 per research site) were randomly selected from the staff. The judges observed the subjects for a fifteen minute period during usual school activities. Inter-judge reliability is based on the judges observing the subjects at the same time and rating each subject independently. Consistency of rating is determined by analysis of the judges' observations compared to one another. The criterion for agreement is within one point on the 1 to 5 scale. The percentage of agreement is determined by dividing the

number of agreements by the number of disagreements. Intra-judge reliability is determined by analysis of each judge's ratings for a number of the subjects again after two weeks.

Design and Statistical Analyses

The language scores from the Gesell Developmental Schedules; the language age, the language quotient, the language level from the Fairview Language Evaluation Scale; and the receptive, expressive, and combined language scores from the Receptive-Expressive-Emergent-Language Scale were analyzed by a 2x3x3 ANOVA from a completely randomized factorial block design (Kirk, 1968).

Pre-Posttest Factorial Analysis of Variance for Two Groups

Table:

		B_1	B_2	B_3
A_1	C_1			
	C_2			
	C_3			
A_2	C_1			
	C_2			
	C_3			

A_1 = Oral Communication Treatment

A_2 = Total Communication Treatment

B = Age

C = Therapists/Schools

Dependent Variables: gain scores on Gesell, Fairview, and REEL measures

Source of Variance

A
B
C
AB
AC
BC
ABC
S(ABC)

The scoures from the AAMD Adaptive Behavior Scale were analyzed by a 2x3 factorial design (Kirk, 1968).

Pre-Posttest Factorial Analysis of Variance for Two Groups

	B_1	B_2	B_3
A_1			
A_2			

A_1 = Oral Communication Treatment

A_2 = Total Communication Treatment

B = Age

Source of Variance

Dependent variable: gain scores on AAMD Adaptive Behavior Scale

A
B
AB
S(AB)

Simple correlation analyses were utilized to explore relationships among the language variables measured by the Gesell Developmental Schedules, the Fairview Language Evaluation Scale, the Receptive-Expressive-Emergent-Language Scale, the AAMD Adaptive Behavior Scale, and chronological age.

The relationship of the scores on the Fairview to the REEL, the

relationship of chronological age to the Gesell, Fairview, REEL, AAMD Scale, and rated functioning level, the relationship of scores on the Fairview, REEL, and the AAMD Scale were systematically explored. Guilford's (1965) interpretation of correlational levels and their significance was utilized.

CHAPTER IV

RESULTS

The Effects of Treatment on Language Development Scores

The language scores from the Gesell Developmental Schedules, the Fairview Language Evaluation Scale, and the Receptive-Expressive-Emergent Language Scale were assessed by 2x3x3 ANOVA from a completely randomized factorial block design (Kirk, 1968). A series of t-tests was conducted to demonstrate the comparison of the mean gains for the two treatment groups (See Table 2).

Hypothesis 1: A Total Communication method of language training will result in greater gains in language development scores than an Oral Communication method as measured by the Gesell Language score.

The results of the Gesell language analysis are shown in Table 3. It can be seen that there was a significant main effect due to treatment ($p = 0.000$). The Total Communication group scores were higher than the Oral Communication group scores (See Table 2).

Hypothesis 2: A Total Communication method of language training will result in greater gains in language development scores than an Oral Communication method as measured by the Fairview Language Age.

The results of the Fairview Language Age analysis are shown in Table 4. It can be seen that there were significant differences ($p = 0.013$) in the gain scores due to treatment and due to therapists ($p = 0.000$) for the Total Communication group (See Table 2). Age did not have significant effects on the differences in gain scores.

Table 2

Comparison of Mean Gains on Language Scores

Variable		Mean Gain	2-Tail Probability
Gesell Language	Group 1	1.3	0.078
	Group 2	3.7	
Fairview Language Age	Group 1	1.5	*0.002
	Group 2	6.4	
Fairview Language Level	Group 1	0.0	*0.001
	Group 2	.23	
Fairview Language Quotient	Group 1	-.17	*0.001
	Group 2	3.38	
REEL Receptive Age	Group 1	1.33	*0.000
	Group 2	5.69	
REEL Expressive Age	Group 1	.73	*0.005
	Group 2	3.34	
REEL Combined Age	Group 1	1.15	*0.002
	Group 2	4.52	
REEL Receptive Quotient	Group 1	.01	*0.000
	Group 2	3.76	
REEL Expressive Quotient	Group 1	.11	*0.011
	Group 2	1.78	
REEL Language Quotient	Group 1	-.21	*0.007
	Group 2	2.74	

Group 1: Oral Communication Method
Group 2: Total Communication Method

Table 3

Factorial Analysis Of Variance
Gesell Language Scores By Treatment By Age By Therapist

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance Level
Main Effects	90.126	5	18.025	4.763	0.000
Treatment	62.447	1	62.447	16.502	0.000
Age	1.066	2	0.553	0.141	0.869
Therapist	4.457	2	2.228	0.589	0.559
Explained	90.126	5	18.025	4.763	0.000
Residual	189.212	50	3.784		
Total	279.338	55	5.079		

Table 4

Factorial Analysis Of Variance
Fairview Language Age By Treatment By Age By Therapist

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance Level
Main Effects	451.875	5	90.375	12.498	0.000
Treatment	222.168	1	221.168	9.876	0.001
Age	21.791	2	10.896	1.507	0.232
Therapist	207.916	2	103.958	11.695	0.000
Explained	451.875	5	90.375	12.498	0.000
Residual	361.551	50	7.231		
Total	813.426	55	14.790		

Hypothesis 3: A Total Communication method of language training will result in greater gains in language development scores than an Oral Communication method as measured by the Fairview Language Level.

The results of the Fairview Language Level analysis can be seen in Table 5. There were significant differences in gain scores due to treatment ($p = 0.001$) for the Total Communication group (See Table 2). There was no significant differences due to age or therapists.

Hypothesis 4: A Total Communication method of language training will result in greater gains in language development scores than an Oral Communication method as measured by the Fairview Language Quotient.

The results of the Fairview Language Quotient analysis can be seen in Table 6. The treatment effect ($p = 0.010$) and therapist effect ($p = 0.000$) were significant to account for the differences in the gain scores of the Total Communication group (See Table 2). Age did not have a significant effect on the differences in the gain scores between the groups.

Hypothesis 5: A Total Communication method of language training will result in greater gains in language development scores than an Oral Communication method as measured by the Receptive-Expressive-Emergent-Language Scale (REEL) Receptive Age.

The results of the analysis of the REEL Receptive Age scores are shown in Table 7. There were significant differences between the two treatment groups due to treatment effect ($p = 0.000$). The Total Communication group had greater gains in scores than the Oral Communication group.

Hypothesis 6: A Total Communication method of language training

Table 5

Factorial Analysis Of Variance
Fairview Language Level By Treatment By Age By Therapist

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance Level
Main Effects	2.149	5	0.430	2.981	0.020
Treatment	1.644	1	1.644	11.401	0.001
Age	0.293	2	0.147	1.018	0.369
Therapist	1.133	2	0.567	3.930	0.260
Explained	2.149	5	0.430	2.981	0.020
Residual	7.208	50	0.144		
Total	9.357	55	0.170		

Table 6

Factorial Analysis Of Variance
Fairview Language Quotient By Treatment By Age By Therapist

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance Level
Main Effects	331.630	5	66.326	4.208	0.003
Treatment	150.029	1	150.029	4.759	0.010
Age	10.808	2	5.404	0.343	0.711
Therapist	315.875	2	157.987	20.040	0.000
Explained	331.630	5	66.326	4.208	0.003
Residual	788.093	50	15.762		
Total	1119.723	55	20.359		

Table 7

Factorial Analysis Of Variance
REEL Receptive Age By Treatment By Age By Therapist

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance Level
Main Effects	279.214	5	55.843	7.203	0.000
Treatment	156.463	1	156.463	20.182	0.000
Age	1.801	2	0.901	0.116	0.891
Therapist	13.611	2	6.878	0.878	0.442
Explained	279.214	5	55.843	7.203	0.000
Residual	387.639	50	7.753		
Total	666.853	55	12.125		

will result in greater gains in language development scores than an Oral Communication method as measured by the REEL Expressive Age.

The results of the REEL Expressive Age analysis are shown in Table 8. It can be seen that the treatment effect was significant ($p = 0.003$). T-tests conducted revealed that the Total Communication group had greater gains on this measure than the Oral Communication group (See Table 2). The difference in gain scores was significant at the $p = 0.005$ level.

Hypothesis 7: A Total Communication method of language training will result in greater gains in language development scores than an Oral Communication method as measured by the REEL Combined Age.

The results of the analysis of the REEL Combined Age scores are shown in Table 9. It can be seen that there was a significant main effect due to treatment ($p = 0.000$). T-tests that were conducted demonstrated that there was a significant difference $p = 0.002$ between the mean gain scores of the two groups (See Table 2). The Total Communication group gain scores were greater than the Oral Communication group scores.

Hypothesis 8: A Total Communication method of language training will result in greater gains in language development scores than an Oral Communication method as measured by the REEL Receptive Quotient.

The results of the REEL Receptive Quotient analysis are shown in Table 10. It can be seen that there was a significant difference between groups due to treatment ($p = 0.000$). T-tests were conducted to demonstrate the mean gains for the treatment groups. The Total Communication group's scores were significantly greater than the Oral

Table 8

Factorial Analysis Of Variance
REEL Expressive Age By Treatment By Age By Therapist

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance Level
Main Effects	101.226	5	20.245	4.222	0.003
Treatment	47.203	1	47.203	9.844	0.003
Age	3.001	2	1.501	0.313	0.733
Therapist	3.586	2	1.793	0.374	0.690
Explained	101.226	5	20.245	4.222	0.003
Residual	239.768	50	4.795		
Total	340.994	55	6.200		

Table 9

Factorial Analysis Of Variance
REEL Combined Age By Treatment By Age By Therapist

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance Level
Main Effects	168.600	5	33.720	7.320	0.000
Treatment	91.222	1	91.222	19.803	0.000
Age	2.890	2	1.445	0.314	0.732
Therapist	7.925	2	3.962	0.860	0.429
Explained	168.600	5	33.720	7.320	0.000
Residual	230.327	50	4.607		
Total	398.926	55	7.253		

Table 10

Factorial Analysis Of Variance
REEL Receptive Quotient By Treatment By Age By Therapist

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance Level
Main Effects	211.190	5	42.238	4.534	0.002
Treatment	171.948	1	171.948	18.457	0.000
Age	6.022	2	3.011	0.323	0.765
Therapist	8.619	2	4.309	0.463	0.632
Explained	211.190	5	42.238		
Residual	465.805	50	9.316		
Total	676.995	55	12.309		

(See Table 2).

Hypothesis 9: A Total Communication method of language training will result in greater gains in language development scores than an Oral Communication method as measured by the REEL Expressive Quotient.

The results of the analysis of the REEL Expressive Quotient are shown in Table 11. It can be seen that there were no significant differences in the pre- and posttest scores due to treatment, age, or therapist. T-tests conducted did demonstrate significant differences ($p = 0.011$) in mean gain scores for the Total Communication gains on the Expressive Quotient (See Table 2).

Hypothesis 10: A Total Communication method of language training will result in greater gains in language development scores than an Oral Communication method as measured by the REEL Language Quotient.

The results of the analysis of the REEL Language Quotient are shown in Table 12. It can be seen that there was a significant difference in the gain scores due to treatment ($p = 0.000$). T-tests that were conducted demonstrated a significant difference $p = 0.007$ between the mean gain scores of the two groups (See Table 2). The Total Communication mean gain scores were greater than the Oral Communication group gain scores.

The Effects of Treatment on Social Skill Ability Scores

The social ability scores from the American Association on Mental Deficiency Adaptive Behavior Scale were assessed by a 2x3 ANOVA from a factorial design (Kirk, 1968). A series of t-tests were conducted to demonstrate the comparison of the mean gains for the two treatment

Table 11

Factorial Analysis Of Variance
REEL Expressive Quotient By Treatment By Age By Therapist

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance Level
Main Effects	45.278	5	9.056	1.428	0.231
Treatment	18.164	1	18.164	2.864	0.097
Age	4.373	2	2.187	0.345	0.710
Therapist	2.482	2	1.241	0.196	0.231
Explained	45.278	5	9.056		
Residual	317.128	50	6.343		
Total	362.406	55	6.589		

Table 12

Factorial Analysis Of Variance
REEL Language Quotient By Treatment By Age By Therapist

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance Level
Main Effects	128.227	5	25.645	4.175	0.003
Treatment	89.540	1	89.540	14.577	0.000
Age	6.174	2	3.087	0.503	0.608
Therapist	0.550	2	0.275	0.045	0.956
Explained	128.227	5	25.645	4.175	0.003
Residual	307.123	50	6.142		
Total	435.350	55	7.915		

groups (See Table 13).

Hypothesis 11: A Total Communication method of language training will result in improved scores in social skill abilities than an Oral Communication method of language training as measured by the AAMD Adaptive Behavior Scale: Part One.

The results of the AAMD Adaptive Behavior Scale: Part One analysis are shown in Table 14. It can be seen that there were no significant differences between the two groups due to treatment or age on the following subscales: Physical Development, Economic Activity; Language Development; Numbers and Time; Domestic Activity; Self-Direction; and Responsibility. Although the difference between groups was not significant for Language Development, t-tests did demonstrate the mean gain scores for the Total Communication group were significantly higher $p = 0.038$ than the Oral Communication group gain scores (See Table 13).

In Tables 14 and 15, it can be seen that there was a significant 2-way interaction of treatment and age $p = 0.023$ on the Independent Functioning subscale. The Total Communication group scores were higher than the Oral Communication group scores (See Table 13).

Age had a significant effect $p = 0.032$ on the Vocational Activity scores of the Total Communication group (See Tables 14, 16). Treatment did not have a significant effect on the difference in the gain scores of the two treatment groups. T-tests demonstrated that the Total Communication group gain scores were significantly greater ($p = .000$) than the Oral Communication group scores (See Table 13).

In Tables 14 and 27, it can be seen that there was a significant 2-way interaction of treatment and age $p = 0.037$ on the Socialization

Table 13

Comparison of Mean Gains on AAMD
Adaptive Behavior Scale

Variable		Mean Gain	2-Tail Probability
Independent Functioning	Group 1	5.4231	0.133
	Group 2	5.5667	
Physical Development	Group 1	0.8667	0.069
	Group 2	1.6538	
Economic Activity	Group 1	0.000	1.000
	Group 2	0.0385	
Language	Group 1	1.2667	*0.038
	Group 2	2.1154	
Numbers and Time	Group 1	0.0000	1.000
	Group 2	0.0385	
Domestic Activity	Group 1	0.300	0.408
	Group 2	0.6923	
Vocational Activity	Group 1	-0.1000	*0.000
	Group 2	0.4231	
Self-Direction	Group 1	1.3000	0.152
	Group 2	2.5769	
Responsibility	Group 1	0.1667	0.395
	Group 2	0.4615	
Socialization	Group 1	3.5769	0.374
	Group 2	4.3000	
Part Two			
Violent Behavior	Group 1	0.7993	*0.011
	Group 2	-2.0385	
Antisocial Behavior	Group 1	-0.1000	*0.041
	Group 2	-1.1923	
Rebellious Behavior	Group 1	0.4333	0.076
	Group 2	-2.3077	
Untrustworthy Behavior	Group 1	-0.0385	*0.000
	Group 2	-0.2333	

Group 1: Oral Communication Method
Group 2: Total Communication Method

Table 13
(Continued)

Variable		Mean Gain	2-Tail Probability
Withdrawal	Group 1	-0.4000	*0.033
	Group 2	-0.6154	
Stereotyped Behavior	Group 1	0.8667	*0.022
	Group 2	-0.2308	
Inappropriate Interpersonal Manners	Group 1	-0.4667	0.133
	Group 2	-0.6538	
Unacceptable Vocal Habits	Group 1	0.7667	0.167
	Group 2	-0.5000	
Eccentric Habits	Group 1	1.3667	*0.004
	Group 2	-1.3462	
Self-Abusive Behavior	Group 1	-0.1000	*0.000
	Group 2	-0.1154	
Hyperactive Tendencies	Group 1	-0.300	0.358
	Group 2	-1.000	
Sexually Aberrant	Group 1	0.0667	*0.008
	Group 2	-1.0385	
Psychological Disturbances	Group 1	-0.5000	0.615
	Group 2	-1.6154	
Use of Medications	Group 1	0.4001	0.370
	Group 2	0.2978	

Group 1: Oral Communication Method
Group 2: Total Communication Method

Table 14

AAMD Adaptive Behavior Scale Summary
Of Factorial Analysis of Variance By Treatment By Age

Subscale Part One	Significance of F	Treatment	Age	2-Way Interaction
Independent Functioning		0.882	0.507	*0.023
Physical Development		0.104	0.441	0.416
Economic Activity		0.311	0.236	0.220
Language Development		0.142	0.731	0.151
Numbers and Time		0.724	0.288	0.273
Domestic Activity		0.198	0.085	0.420
Vocational Activity		0.260	*0.032	0.237
Self-Direction		0.074	0.491	0.299
Responsibility		0.359	0.614	0.501
Socialization		0.403	0.209	*0.037
Part Two				
Violent Behavior		0.080	0.270	0.809
Antisocial Behavior		0.332	0.904	0.409
Rebellious Behavior		*0.050	0.739	0.482
Untrustworthy Behavior		0.619	0.882	0.607

Table 14
(Continued)

Subscale Part Two	Significance of F	Treatment	Age	2-Way Interaction
Withdrawal		0.848	0.833	0.075
Stereotyped Behavior		0.341	0.921	0.524
Inappropriate Interpersonal Manners		0.669	0.349	0.921
Unacceptable Vocal Habits		*0.005	0.818	0.381
Eccentric Habits		*0.020	0.713	0.841
Self-Abusive		0.944	0.460	0.709
Hyperactive Tendencies		0.217	0.721	0.988
Sexually Aberrant Behavior		*0.030	*0.001	0.098
Psychological Disturbances		0.267	0.335	0.699
Use of Medication		0.204	0.559	0.161

Table 15

Factorial Analysis of Variance
AAMD Adaptive Behavior Scale: Independent Functioning By Treatment By Age

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance Level
Main Effects	38.733	3	12.911	0.463	0.710
Treatment	0.622	1	0.622	0.022	0.882
Age	38.446	2	19.223	0.689	0.507
2-Way Interactions	227.989	2	113.995	4.085	0.023
Treat X Age	227.990	2	113.995	4.085	0.023
Explained	266.723	5	53.345	1.912	0.109
Residual	1295.272	50	27.905		
Total	1661.995	55	30.218		

Table 16

Factorial Analysis of Variance
AAMD Adaptive Behavior Scale: Vocational Activity By Treatment By Age

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance Level
Main Effects	9.430	3	3.143	2.917	0.043
Treatment	1.401	1	1.401	1.300	0.260
Age	7.976	2	3.988	3.701	0.032
2-Way Interactions	3.195	2	1.597	1.483	0.237
Treat X Age	3.195	2	1.597	1.483	0.237
Explained	12.625	5	2.525	2.343	0.055
Residual	53.875	50	1.077		
Total	66.500	55	1.209		

Table 17

Factorial Analysis of Variance
AAMD Adaptive Behavior Scale: Socialization By Treatment By Age

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance Level
Main Effects	48.311	3	16.104	1.267	0.296
Treatment	9.033	1	9.033	0.711	0.403
Age	41.028	2	20.514	1.614	0.209
2-Way Interactions	89.936	2	44.968	3.537	0.037
Treat X Age	89.936	2	44.968	3.537	0.037
Explained	138.247	5	27.649	2.175	0.072
Residual	635.677	50	12.714		
Total	773.924	55	14.071		

subscale. T-tests demonstrated that the Total Communication group gain scores were higher than the Oral Communication group scores, but there was no significant difference in the gain scores (See Table 13).

Hypothesis 12: A Total Communication method of language training will result in improved scores in social skill abilities than an Oral Communication method of language training as measured by the AAMD Adaptive Behavior Scale: Part Two.

The results of the AAMD Adaptive Behavior Scale: Part Two analysis are shown in Table 14. It can be seen that there were no significant differences between the groups due to treatment or age on the following subscales: Violent Behavior; Antisocial Behavior; Withdrawal; Stereotyped Behavior; Inappropriate Interpersonal Manners; Hyperactive Tendencies; Psychological Disturbances; and Use of Medications. T-tests conducted did demonstrate significant differences in improved scores for the Total Communication group on the following subscales: Violent Behavior - $p = 0.011$; Antisocial Behavior - $p = 0.041$; Untrustworthy Behavior - $p = 0.000$; Withdrawal - $p = 0.033$; Stereotyped Behavior - $p = 0.022$ and Self-Abusive Behavior - $p = 0.000$ (See Table 13).

In Tables 14 and 18, it can be seen that there was a significant treatment effect $p = 0.050$ on the Rebellious Behavior subscale. The Total Communication group scores improved more than the Oral Communication group (See Table 13).

Treatment had a significant effect $p = 0.005$ (See Tables 14 and 19) on the Unacceptable Vocal Habits scores of the Total Communication group (See Table 13). Age did not have a significant effect on the gain scores.

It can be seen in Tables 14 and 20 that there were significant differences in the gain scores on Eccentric Habits due to treatment $p = 0.020$. The Total Communication group had significantly improved scores $p = 0.004$ (See Table 13).

In Tables 14 and 21, it can be seen that there were significant differences in the gain scores on Sexually Aberrant Behavior due to treatment $p = 0.030$ and Age $p = 0.001$. The Total Communication group had significantly improved scores $p = 0.008$ (See Table 13).

The Relationship Between Age and Rate of Language Acquisition

Simple correlational analyses were used to explore relationships among the language variables measured by the Gesell Developmental Schedules, the Fairview Language Evaluation Scale, and the Receptive-Expressive-Emergent-Language Scale with chronological age, with each other, and with social skill ability. Relationships of social skill ability and rated functioning level were also explored.

For correlational analyses Guilford's (1965) interpretation of correlational levels and their significance was followed. These levels are: r less than .20 is a slight and almost negligible relationship; r .20 to .40 is a definite but small relationship; r .40 to .70 is a moderate, substantial relationship; r .70 yo .90 is a high and marked relationship; r above .90 is a very high, very dependable relationship.

Hypothesis 13: There is an inverse relationship between age and the rate of acquisition of signs and/or oral vocabulary as measured by the Gesell Language score, the Fairview Language Evaluation Scale (language age; language level; language quotient), and the Receptive-

Table 18

Factorial Analysis of Variance
AAMD Adaptive Behavior Scale: Rebellious Behavior By Treatment By Age

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance Level
Main Effects	120.913	3	40.304	1.507	0.224
Treatment	102.037	1	102.037	3.816	0.050
Age	16.264	2	8.132	0.304	0.739
2-Way Interactions	39.644	2	19.822	0.741	0.482
Treat X Age	39.644	2	19.822	0.741	0.482
Explained	160.557	5	32.111	1.201	0.322
Residual	1336.993	50	26.740		
Total	1497.550	55	27.228		

Table 19

Factorial Analysis of Variance
AAMD Adaptive Behavior Scale: Unacceptable Vocal Habits By Treatment By Age

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance Level
Main Effects	23.378	3	7.993	3.049	0.037
Treatment	21.865	1	21.865	8.554	0.005
Age	1.031	2	0.515	0.202	0.818
2-Way Interactions	5.035	2	2.518	0.985	0.381
Treat X Age	5.035	2	2.518	0.985	0.381
Explained	28.414	5	5.683	2.223	0.066
Residual	127.800	50	2.556		
Total	156.214	55	2.840		

Table 20

Factorial Analysis of Variance
AAMD Adaptive Behavior Scale: Eccentric Habits By Treatment By Age

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance Level
Main Effects	114.559	3	38.186	2.158	0.105
Treatment	102.580	1	102.580	5.798	0.020
Age	12.053	2	6.027	0.341	0.713
2-Way Interactions	6.149	2	3.074	0.174	0.841
Treat X Age	6.149	2	3.074	0.174	0.841
Explained	120.708	5	24.142	1.364	0.254
Residual	884.645	50	17.693		
Total	1005.353	55	18.279		

Table 21

Factorial Analysis of Variance
AAMD Adaptive Behavior Scale: Sexually Aberrant Behavior By Treatment By Age

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance Level
Main Effects	64.541	3	21.514	7.411	0.000
Treatment	14.572	1	14.572	5.019	0.030
Age	47.530	2	23.765	8.186	0.001
2-Way Interactions	14.144	2	7.072	2.436	0.098
Treat X Age	14.144	2	7.072	2.436	0.098
Explained	78.685	5	15.737	5.421	0.000
Residual	145.154	50	2.903		
Total	223.839	55	4.070		

Expressive-Emergent-Language Scale (receptive age; expressive age; combined age; receptive quotient; expressive quotient; language quotient).

The results of the analysis of the correlation coefficients between age and the language variables are shown in Table 22. It can be seen that age was in an inverse relationship to all the language measures except the Fairview Language Level which is due to the construction of the scale (best=1; poorest=5). The relationship was not at a significant level for the following language measures: Gesell Language score; Fairview Language Age; REEL Receptive Age; REEL Expressive Age; and REEL Combined Age.

The correlation of chronological age with the Fairview Language Level was significant at the $p = 0.01$ level. The correlation, $r = +0.2998$ is a definite but small relationship.

The correlation of age with the Fairview Language Quotient was significant at the $p = 0.001$ level. The correlation $r = -0.4205$ is a moderate, substantial relationship.

The correlation of age with the REEL Receptive Quotient was significant at the $p = 0.003$ level. The correlation $r = -0.3660$ is a definite but small relationship.

The correlation of age with the REEL Expressive Quotient was significant at the $p = 0.002$ level. The correlation $r = -0.3762$ is a small but definite relationship.

The correlation of age with the REEL Language Quotient was significant at the $p = 0.002$ level. The correlation $r = -0.3730$ is a small but definite relationship.

Table 22

Pearson Correlation Coefficients
Age With Language Variables

Variable	Age
Gesell Language	-0.0196 p = 0.443
Fairview Language Age	-0.0532 p = 0.349
Fairview Language Level	+0.2998 *p = 0.010
Fairview Language Quotient	-0.4205 *p = 0.001
REEL Receptive Age	-0.0968 p = 0.239
REEL Expressive Age	-0.0566 p = 0.339
REEL Combined Age	-0.0442 p = 0.373
REEL Receptive Quotient	-0.3660 *p = 0.003
REEL Expressive Quotient	-0.3762 *p = 0.002
REEL Language Quotient	-0.3730 *p = 0.002

The Relationship Between Language Measures

Hypothesis 14: There is a positive relationship between language ability as measured by the Fairview Language Evaluation Scale and the Receptive-Expressive-Emergent Language Scale.

The results of the analyses of the correlation coefficients of language ability as measured by the Fairview Language Evaluation Scale and the REEL Scale are shown in Tables 23, 24, and 25. It can be seen that the relationships between the Fairview Language Age and the REEL Receptive Age ($r = 0.9033$) and Receptive Quotient ($r = 0.8982$) were significant at the $p = 0.000$ level. The correlations between the Language Age and the REEL Expressive Age ($r = 0.7759$) and Expressive Quotient ($r = 0.7812$) were high and marked relationships significant at the $p = 0.001$ and $p = 0.000$ levels. The correlations between the Language Age and the REEL Combined Age ($r = 0.9497$) and REEL Language Quotient ($r = 0.9338$) were very high, very dependable relationships at the $p = 0.000$ level of significance.

The correlations between the Fairview Language Level and the REEL measures were in inverse relationships (See Table 24). The correlation between the Fairview Language Level and the REEL Receptive Age was significant at the $p = 0.002$ level. The correlation $r = -.7049$ is a high and marked relationship. The correlation between Language Level and the REEL Combined Age was significant at the $p = 0.010$ level. The correlation $r = -0.5903$ is a moderate and substantial relationship. The correlation between Language Level and the REEL Receptive Quotient was significant at the $p = 0.003$ level. The correlation $r = -0.7001$ is a high and marked relationship. The correlation between the Language

Table 23

Pearson Correlation Coefficients
Fairview Language Evaluation Scale: Language Age With The
Receptive-Expressive-Emergent-Language Scale

Variable	Fairview Language Age
REEL Receptive Age	r = 0.9033 *p = 0.000
REEL Expressive Age	r = 0.7759 *p = 0.001
REEL Combined Age	r = 0.9497 *p = 0.000
REEL Receptive Quotient	r = 0.8982 *p = 0.000
REEL Expressive Quotient	r = 0.7812 *p = 0.000
REEL Language Quotient	r = 0.9338 *p = 0.000

Table 24

Pearson Correlation Coefficients
Fairview Language Evaluation Scale: Language Level With The REEL

Variable	Fairview Language Level
REEL Receptive Age	-0.7049 *p = 0.002
REEL Expressive Age	-0.2999 p = 0.149
REEL Combined Age	-0.5903 *p = 0.010
REEL Receptive Quotient	-0.7001 *p = 0.003
REEL Expressive Quotient	-0.3087 p = 0.141
REEL Language Quotient	-0.6092 *p = 0.010

Table 25

Pearson Correlation Coefficients
Fairview Language Evaluation Scale: Language Quotient With The REEL

Variable	Fairview Language Quotient
REEL Receptive Age	0.9093 *p = 0.000
REEL Expressive Age	0.7766 *p = 0.001
REEL Combined Age	0.9538 *p = 0.000
REEL Receptive Quotient	0.9101 *p = 0.000
REEL Expressive Quotient	0.7863 *p = 0.000
REEL Language Quotient	0.9340 *p = 0.000

Level and the REEL Language Quotient was significant at the p = 0.010 level. The correlation r = -0.6092 is a moderate and substantial relationship (See Table 24).

The correlations between the Fairview Language Quotient and the REEL Receptive Age (r = 0.9093) and Receptive Quotient (r = .9101) were very high, very dependable relationships significant at the p = 0.000 level. The correlations between the Fairview Language Quotient and the REEL Expressive Age (r = 0.7776) and the Expressive Quotient (r = 0.7863) were high, marked relationships significant at the p = 0.000 level. The correlations between the Fairview Language Quotient and the REEL Combined Age (r = 0.9538) and REEL Language Quotient (r = 0.9340) were very high, very dependable relationships significant at the p = 0.000 level.

The Relationship Between Language Ability and Social Skill Ability

Hypothesis 15: There is a positive relationship between language ability (measured by the Fairview Language Evaluation Scale and the Receptive-Expressive-Emergent-Language Scale) and social skill ability (assessed by the AAMD Adaptive Behavior Scale: Part One).

The results of the analyses of the correlation coefficients of language ability with social skill ability are shown in Table 26. It can be seen that the Fairview Language Age was in a positive, although not significant relationship with the following adaptive behaviors: Physical Development; Domestic Activity; Vocational Activity; and Responsibility. The correlation between Language Age and Economic Activity was significant at the p = 0.001 level. The correlation

r = 0.4052 is a moderate and substantial relationship. The correlations between Language Age and Independent Functioning (r = 0.5881), Numbers and Time (r = .4894), Self-Direction (r = 0.5559) and Socialization (r = 0.6744) were moderate, substantial relationships significant at the p = 0.000 level. There was a high, marked relationship between Language Age and Language Development (r = 0.7372) at the p = 0.000 level of significance.

The Fairview Language Level was in inverse, but not significant, relationship with the following behaviors: Independent Functioning; Physical Development; Economic Activity; Numbers and Time; Domestic Activity; Vocational Activity; and Responsibility. There were moderate, substantial relationships between the Language Level and Language Activity (r = -0.4494); Self-Direction (r = -0.4371); and Socialization (r = -0.5710) which were significant at the p = 0.000 level (See Table 26).

The Fairview Language Quotient was in a positive, significant relationship at the p = 0.001 level with Self-Direction. The correlation r = 0.4242 was a moderate and substantial relationship. The correlations between the Fairview Language Quotient and Language Development (r = 0.5367) and Socialization (r = 0.6170) were moderate, substantial relationships at the p = 0.000 level of significance. It can be seen that the Fairview Language Quotient was in positive relationship, though not significant, with the rest of the social skill abilities (See Table 26).

The correlation of the REEL Receptive Age with Independent Functioning (r = 0.5815) was a moderate, substantial relationship at the

p = 0.000 level of significance. The high, marked relationship between the Receptive Age with Language Development (r = 0.7403) was significant at the p = 0.000 level. The correlation with Numbers and Time (r = 0.3647) was a small but definite relationship at the p = 0.003 level of significance. The small but definite correlation with Domestic Activity (r = 0.3344) was significant at the p = 0.006 level. The correlation of Receptive Age with Self-Direction (r = 0.6216) which was a moderate, substantial relationship, was significant at the p = 0.000 level. The small but definite relationship with Responsibility (r = 0.2149) was at the p = 0.050 level of significance. The correlation with Socialization (r = 0.7101) was a high, marked relationship significant at the p = 0.000 level (See Table 26).

The REEL Expressive Age was in moderate substantial relationships with Independent Functioning (r = 0.4319); Language Development (r = 0.6695); Self-Direction (r = 0.4705); and Self-Direction (r = 0.6377). These correlations were significant at the p = 0.000 level (See Table 26).

The correlation between the REEL Combined Age with Independent Functioning (r = 0.5438) was a moderate, substantial relationship significant at the p = 0.000 level. The relationship with Economic Activity (r = 0.3406) was small but definite. This correlation was at the p = 0.005 level of significance. The REEL Combined Age was in a high, marked relationship with Language (r = 0.7471) significant at the p = 0.000 level. The small but definite relationships of Combined Age with Numbers and Time (r = 0.3004) was significant at the p = 0.010 level. Also there was a small but definite relationship with Domestic

Activity (r = 0.2164) which was significant at the p = 0.050 level. Combined Age was in a moderate, substantial relationship with Self-Direction (r = 0.5849) which was significant at the p = 0.000 level. The correlation between Combined Age and Socialization was significant at the p = 0.000 level. The correlation r = 0.7168 is a high, marked relationship (See Table 26).

The REEL Receptive Quotient was in a moderate, substantial relationship with Language (r = 0.5416); Self-Direction (r = .6972); and Socialization (r = 0.6097). These correlations were significant at the p = 0.000 level (See Table 26).

The REEL Expressive Quotient was in moderate, substantial relationship with Language (r = 0.5107); Self-Direction (r = 0.6570); and Socialization (r = 0.5421). These correlations were at the p = 0.000 level of significance (See Table 26).

The REEL Language Quotient was in moderate, substantial relationship with Language (r = 0.5411); Self-Direction (r = 0.6832); and Socialization (r = 0.5961). These correlations were significant at the p = 0.000 level (See Table 26).

Hypothesis 16: There is an inverse relationship between language ability (assessed by the Fairview Language Evaluation Scale and the Receptive-Expressive-Emergent-Language Scale) and social skill ability (assessed by the AAMD Adaptive Behavior Scale: Part Two).

The results of the analyses of the correlation coefficients of language ability with social skill ability are shown in Table 27. It can be seen that language ability as measured by the Fairview Language Evaluation Scale and the Receptive-Expressive-Emergent-Language Scale

Table 26

Pearson Correlation Coefficients
Fairview Language Evaluation Scale and Receptive-Expressive-Emergent-Language Scale With The AAMD Adaptive Behavior Scale: Part One

	Independent Functioning	Physical Development	Economic Activity	Language Development	Numbers & Time
Fairview Language Age	0.5881 *p = 0.000	0.2875 p = 0.070	0.4052 *p = 0.001	0.7372 *p = 0.000	0.4894 *p = 0.000
Fairview Language Level	-0.0822 p = 0.273	-0.1013 p = 0.229	-0.0413 p = 0.381	-0.4494 *p = 0.000	-0.1148 p = 0.200
Fairview Language Quotient	0.1857 p = 0.085	0.0402 p = 0.384	0.1247 p = 0.180	0.5367 *p = 0.000	0.1695 p = 0.106
REEL Receptive Age	0.5815 *p = 0.000	0.1319 p = 0.083	0.4430 p = 0.000	0.7403 *p = 0.000	0.3647 *p = 0.003
REEL Expressive Age	0.4319 *p = 0.000	0.1835 p = 0.088	0.1811 p = 0.091	0.6695 *p = 0.000	0.1884 p = 0.082
REEL Combined Age	0.5438 *p = 0.000	0.2103 p = 0.060	0.3406 *p = 0.005	0.7471 *p = 0.000	0.3004 *p = 0.010
REEL Receptive Quotient	0.1591 p = 0.121	0.0814 p = 0.276	0.1133 p = 0.203	0.5416 *p = 0.000	0.1066 p = 0.217
REEL Expressive Quotient	0.1368 p = 0.157	0.0583 p = 0.335	0.002 p = 0.499	0.5107 *p = 0.000	0.0153 p = 0.455
REEL Language Quotient	0.1475 p = 0.139	0.0713 p = 0.301	0.0624 p = 0.324	0.5411 *p = 0.000	0.0663 p = 0.314

Table 26
(Continued)

	Domestic Activity	Vocational Activity	Self-Direction	Responsibility	Socialization
Fairview Language Age	0.1794 p = 0.093	0.0123 p = 0.464	0.5559 *p = 0.000	0.1794 p = 0.093	0.6744 *p = 0.000
Fairview Language Level	-0.0512 p = 0.354	-0.1230 p = 0.183	-0.4371 *p = 0.000	-0.1295 p = 0.171	-0.5710 *p = 0.000
Fairview Language Quotient	0.0168 p = 0.451	0.0874 p = 0.261	0.4242 *p = 0.001	0.0012 p = 0.497	0.6170 *p = 0.000
REEL Receptive Age	0.3344 *p = 0.006	0.0161 p = 0.453	0.6216 *p = 0.000	0.2149 *p = 0.050	0.7101 *p = 0.000
REEL Expressive Age	0.0787 p = 0.282	0.0417 p = 0.380	0.4705 *p = 0.000	0.2001 p = 0.070	0.6377 *p = 0.000
REEL Combined Age	0.2164 *p = 0.050	0.0330 p = 0.405	0.5849 *p = 0.000	0.2251 p = 0.048	0.7168 *p = 0.000
REEL Receptive Quotient	0.0956 p = 0.242	0.0565 p = 0.340	0.6972 *p = 0.000	0.0304 p = 0.412	0.6097 *p = 0.000
REEL Expressive Quotient	0.0469 p = 0.366	0.0340 p = 0.402	0.6570 *p = 0.000	0.0036 p = 0.490	0.5421 *p = 0.000
REEL Language Quotient	0.0250 p = 0.427	-0.0513 p = 0.354	0.6832 *p = 0.000	0.0103 p = 0.470	0.5961 *p = 0.000

was in inverse relationship to the behavior domains of the AAMD Adaptive Behavior Scale: Part Two. The only exception to this inverse relationship was the Fairview Language Level, due to its inverse scale.

The correlation between the Fairview Language Age with Withdrawal was significant at the $p = 0.005$ level. The correlation $r = -0.3774$ is a small but definite relationship. The correlations between Language Age with Stereotyped Behavior and Inappropriate Interpersonal Manners was significant at the $p = 0.002$ level. The correlation $r = -0.3707$ was a small but definite relationship. The correlation between Language Age with Eccentric Habits was significant at the $p = 0.010$ level. The correlation $r = -0.2864$ is a small but definite relationship (See Table 27).

The correlation between the Fairview Language Level and Withdrawal was significant at the $p = 0.008$ level. The correlation $r = 0.3223$ is a small but definite relationship. Language Level was in positive relationship to Stereotyped Behavior and Inappropriate Interpersonal Manners, significant at the $p = 0.004$ level. The correlation $r = 0.3474$ is a small but definite relationship (See Table 27).

The correlation between the Fairview Language Quotient and Withdrawal was significant at the $p = 0.001$ level. The correlation $r = 0.4171$ was a moderate and substantial relationship. The Fairview Language Quotient was in moderate, substantial relationship with Stereotyped Behavior ($r = -0.4500$) and with Inappropriate Interpersonal Manners ($r = -0.4500$) significant at the $p = 0.000$ level (See Table 27).

The correlation of the REEL Receptive Age and Rebellious Behavior was significant at the $p = 0.026$ level. The correlation $r = -0.2619$ is

Table 27

Pearson Correlation Coefficients
Fairview Language Evaluation Scale and Receptive-Expressive-Emergent-Language Scale With The AAMD Adaptive Behavior Scale: Part Two

	Violent Behavior	Antisocial Behavior	Rebellious Behavior	Untrustworthy Behavior	Withdrawal	Stereotyped Behavior	Inappropriate Interpersonal Manners
Fairview Language Age	-0.0454 p = 0.370	-0.0604 p = 0.329	-0.1970 p = 0.073	-0.0511 p = 0.354	-0.3374 *p = 0.005	-0.3707 *p = 0.002	-0.3707 *p = 0.002
Fairview Language Level	+0.1282 p = 0.173	+0.0724 p = 0.298	+0.1082 p = 0.214	+0.1294 p = 0.171	+0.3223 *p = 0.008	+0.3474 *p = 0.004	+0.3474 *p = 0.004
Fairview Language Quotient	-0.0953 p = 0.242	-0.0872 p = 0.261	-0.1537 p = 0.129	-0.1135 p = 0.202	-0.4171 *p = 0.001	-0.4500 *p = 0.000	-0.4500 *p = 0.000
REEL Receptive Age	-0.0642 p = 0.319	-0.0224 p - 0.435	-0.2619 *p = 0.026	-0.0169 p = 0.451	-0.4013 *p = 0.001	-0.4348 *p = 0.000	-0.4348 *p = 0.000
REEL Expres-sive Age	-0.0603 p = 0.329	-0.0522 p = 0.357	-0.1598 p = 0.120	-0.0499 p = 0.359	-0.3643 *p = 0.003	-0.3962 *p = 0.001	-0.3962 *p = 0.001
REEL Combined Age	-0.0004 p = 0.499	-0.0191 p = 0.444	-0.2161 *p = 0.050	-0.299 p = 0.413	-0.3935 *p = 0.001	-0.4328 *p = 0.000	-0.4328 *p = 0.000
REEL Receptive Quotient	-0.0776 p = 0.285	-0.1601 p = 0.119	-0.2007 p = 0.069	-0.1584 p = 0.122	-0.4186 *p = 0.001	-0.4735 *p = 0.000	-0.4735 *p = 0.000

Table 27
(Continued)

	Violent Behavior	Antisocial Behavior	Rebellious Behavior	Untrustworthy Behavior	Withdrawal	Stereotyped Behavior	Inappropriate Interpersonal Manners
REEL Expressive Quotient	-0.1419 p = 0.148	0.1682 p = 0.108	-0.1242 p = 0.181	-0.0438 p = 0.374	-0.3789 *p = 0.002	-0.3966 *p = 0.001	-0.3966 *p = 0.001
REEL Language Quotient	-0.1081 p = 0.214	0.1645 p = 0.113	-0.1740 p = 0.100	-0.1076 p = 0.215	-0.4135 *p - 0.001	-0.4523 *p = 0.000	-0.4523 *p = 0.000

	Unacceptable Vocal Habits	Eccentric Habits	Self-Abusive	Hyperactive Tendencies	Sexually Aberrant Behavior	Psychological Disturbances	Use of Medication
Fairview Language Age	-0.0352 p = 0.398	-0.2864 *p = 0.010	-0.1207 p = 0.188	-0.0613 p = 0.327	0.1023 p = 0.226	-0.0082 p = 0.476	-0.1262 p = 0.177
Fairview Language Level	+0.1584 p = 0.122	+0.1794 p = 0.093	+0.0290 p = 0.416	+0.0847 p = 0.267	+0.1118 p = 0.206	+0.0508 p = 0.355	+0.1781 p = 0.091
Fairview Language Quotient	-0.1524 p = 0.131	-0.2055 p = 0.064	-0.0080 p = 0.477	-0.0591 p = 0.333	-0.1257 p = 0.178	-0.0549 p = 0.344	-0.1695 p = 0.086
REEL Receptive Age	-0.0767 p = 0.287	-0.3133 *p = 0.009	-0.1226 p = 0.184	-0.1514 p = 0.133	-0.0796 p = 0.280	-0.0799 p = 0.279	-0.1881 p = 0.095

Table 27
(Continued)

	Unacceptable Vocal Habits	Eccentric Habits	Self-Abusive	Hyperactive Tendencies	Sexually Aberrant Behavior	Psychological Disturbances	Use of Medication
REEL Expressive Age	-0.0317 p = 0.408	-0.2184 p = 0.059	-0.0710 p = 0.302	-0.0823 p = 0.273	-0.1173 p = 0.195	-0.0415 p = 0.381	-0.0034 p = 0.499
REEL Combined Age	-0.0487 p = 0.361	-0.2757 *p = 0.020	-0.0964 p = 0.240	-0.1130 p = 0.203	-0.0043 p = 0.488	-0.0582 p = 0.335	-0.0045 p = 0.488
REEL Receptive Quotient	-0.1563 p = 0.125	-0.2170 *p = 0.050	-0.0089 p = 0.474	-0.0943 p = 0.245	-0.1538 p = 0.129	-0.1409 p = 0.150	-0.0080 p = 0.477
REEL Expressive Quotient	-0.0975 p = 0.237	-0.1512 p = 0.133	-0.0249 p = 0.428	-0.0504 p = 0.356	-0.2092 p = 0.061	-0.1042 p = 0.222	-0.0042 p = 0.486
REEL Language Quotient	-0.1247 p = 0.180	-0.2036 p = 0.066	-0.0124 p = 0.464	-0.0833 p = 0.271	-0.1756 p = 0.098	-0.1339 p = 0.165	-0.0049 p = 0.489

a small but definite relationship. The correlation of Receptive Age and Withdrawal was significant at the p = 0.001 level. The correlation r = -0.4013 is a moderate and substantial relationship. Receptive Age was in moderate, substantial relationship with Stereotyped Behavior (r = -0.4348) and with Inappropriate Interpersonal Manners (r = -0.4348) significant at the p = 0.000 level. The correlation of Receptive Age and Eccentric Habits was significant at the p = 0.009 level. The correlation r = -0.3133 is a small but definite relationship (See Table 27).

The correlation of the REEL Expressive Age and Withdrawal was significant at the p = 0.003 level. The correlation r = -0.3643 is a small but definite relationship. The correlations between Expressive Age with Stereotyped Behavior and with Inappropriate Interpersonal Manners were significant at the p = 0.001 level. The correlation r = -0.3962 is a small but definite relationship (See Table 27).

The correlation of the REEL Combined Age and Rebellious Behavior was significant at the p = 0.050 level. The correlation r = -0.2162 is a small but definite relationship (See Table 27). The correlation between Combined Age and Withdrawal was significant at the p = 0.001 level. The correlation r = -.3935 is a small but definite relationship. Combined Age was in moderate, substantial relationship with Stereotyped Behavior (r = -0.4328) and with Inappropriate Interpersonal Manners (r = -0.4328) significant at the p = 0.000 level. Combined Age was related to Eccentric Habits at the p = 0.020 level of significance. The correlation r = -0.2757 is a small but definite relationship (See Table 27).

The REEL Receptive Quotient was in significant relationship to

Withdrawal at the p = 0.001 level. The correlation r = -0.4186 is a moderate and substantial relationship. The correlations between Receptive Quotient with Stereotyped Behavior and with Inappropriate Interpersonal Manners were significant at the p = 0.000 level. The correlations r = -0.4735 are moderate, substantial relationships. The correlation between the Receptive Quotient and Eccentric Habits was significant at the p = 0.050 level. The correlation r = -0.2170 is a small but definite relationship (See Table 27).

The REEL Expressive Quotient was correlated with Withdrawal at the p = 0.002 level of significance. The correlation r = -0.3789 is a small but definite relationship. The correlations of the Expressive Quotient with Stereotyped Behaviors and with Inappropriate Interpersonal Manners were significant at the p = 0.001 level. The correlation r = -0.3966 is a small but definite relationship (See Table 27).

The correlation between the REEL Language Quotient and Withdrawal was significant at the p = 0.001 level. The correlation r = -0.4135 is a moderate and substantial relationship. The REEL Language Quotient was in moderate, substantial relationship with Stereotyped Behaviors (r = -0.4523) and with Inappropriate Interpersonal Manners (r = -0.4523) significant at the p = 0.000 level (See Table 27).

The Relationship Between a Standardized Measure of Social Skill Ability and a Rating by Judges

Hypothesis 17: There is a positive relationship between social skill ability as measured by the AAMD Adaptive Behavior Scale: Part One and a rating by judges of functional level.

Table 28

Pearson Correlation Coefficients
Rated Functioning Level With AAMD Adaptive Behavior Scale: Part One

Variable	
Independent Functioning	0.1160 p = 0.197
Physical Development	0.0591 p = 0.333
Economic Activity	0.1325 p = 0.165
Language	0.1008 p = 0.230
Numbers & Time	0.0 p = 0.500
Domestic Activity	0.3776 *p = 0.002
Vocational Activity	0.0966 p = 0.239
Self-Direction	0.3294 *p = 0.007
Responsibility	0.2324 *p = 0.042
Socialization	0.1888 p = 0.082

The results of the analyses of the correlation coefficients of social skill ability with a rating of functional level are shown in Table 28. It can be seen that there are positive relationships, but not significant, between the rated functional level and the following social skill abilities: Independent Functioning; Physical Development; Economic Activity; Language; Numbers and Time; Vocational Activity; and Socialization.

The correlation of the rated functional level with Domestic Activity was significant at the $p = 0.002$ level. The correlation $r = .3776$ is a definite but small relationship.

The correlation of the rated functional level with Self-Direction was significant at the $p = 0.007$ level. The correlation $r = .3294$ is a definite but small relationship.

The correlation of rated functional level with Responsibility was significant at the $p = 0.042$ level. The correlation $r = .2324$ is a definite but small relationship.

Hypothesis 18: There is an inverse relationship between social skill ability as measured by the AAMD Adaptive Behavior Scale: Part Two and a rating by judges of functional level.

The results of the analyses of the correlation coefficients of social skill ability with a rating of functional level are shown in Table 29. It can be seen that there are inverse, but not significant, relationships between the rated functional level and the following behavior domains: Antisocial Behavior; Untrustworthy Behavior; Inappropriate Interpersonal Manners; Self-Abusive Habits; Hyperactive Tendencies; Sexually Aberrant Behavior; and Use of Medications.

Table 29

Pearson Correlation Coefficients
Rated Functioning Level With AAMD Adaptive Behavior Scale: Part Two

Variable	Rated Functioning Level
Violent Behavior	-0.2144 *p = 0.050
Antisocial Behavior	-0.1834 p = 0.088
Rebellious Behavior	-0.2952 *p = 0.014
Untrustworthy Behavior	-0.0132 p = 0.462
Withdrawal	-0.0046 p = 0.487
Stereotyped Behavior	-0.1288 p = 0.172
Inappropriate Interpersonal Manners	-0.1404 p = 0.151
Unacceptable Vocal Habits	-0.3047 *p = 0.011
Eccentric Habits	-0.2609 *p = 0.026
Self-Abusive Habits	-0.1282 p = 0.173
Hyperactive Tendencies	-0.1814 p = 0.090
Sexually Aberrant Behavior	-0.1931 p = 0.077
Psychological Disturbances	-0.3474 *p = 0.004
Use of Medications	-0.1194 p = 0.190

The correlation of rated functional level with Violent Behavior was significant at the $p = 0.050$ level. The correlation $r = -0.2144$ is a definite but small relationship.

The correlation of rated functional level with Rebellious Behavior was significant at the $p = 0.014$ level. The correlation $r = -0.2952$ is a definite but small relationship.

The correlation of rated functional level with Unacceptable Vocal Habits was significant at the $p = 0.011$ level. The correlation $r = -0.3047$ is a definite but small relationship.

The correlation of rated functional level with Eccentric Habits was significant at the $p = 0.026$ level. The correlation $r = -0.2609$ is a definite but small relationship.

The correlation of rated functional level with Psychological Disturbances was significant at the $p = 0.004$ level. The correlation $r = -0.3474$ is a definite but small relationship.

Judged Functioning Level

Reliability: The nine judges (3 per site; who received no additional training for this study) rated subjects on functional level using a 1 (poorest) to 5 (best) scale. Interjudge reliability was determined by having the judges observe the subjects at the same time and independently rate each one on the five point scale. Criterion for agreement was a rating within one point of the ratings of the other judges: Percentage of Agreement = the number of agreements divided by the number of agreements plus the number of disagreements. Intrajudge reliability was determined by having each judge rate ten of

the subjects (per site) again after a time lapse of two weeks.

Analyses yielded a coefficient of .88 for interjudge reliability at site 1; .95--site 2; and .92--site 3. Intrajudge reliability, percent of agreement of each judge with himself, yielded the following reliability coefficients:

Site 1:	Judge 1	.89	Site 3:	Judge 1	1.00
	2	.93		2	.85
	3	1.00		3	.91
Site 2:	Judge 1	.84			
	2	.96			
	3	.81			

The high reliability coefficients indicated that the judges who rated the subjects were in general agreement among and with themselves on the rating of functional level.

An attempt was made to identify other variables which possibly related to the judged functioning. The results of a series of Pearson correlations that were conducted are shown in Table 30.

The correlation of rated functional level with the Gesell Language scores was significant at the $p = 0.004$ level. The correlation $r = 0.3535$ is a definite but small relationship.

The correlation of rated functional level with the Gesell Personal-Social score was significant at the $p = 0.043$ level. The correlation $r = 0.2322$ is a definite but small relationship.

The correlation of rated functional level with the Fairview Language Quotient was significant at the $p = 0.027$ level. The correlation $r = 0.2597$ is a definite but small relationship.

The correlation of rated functional level with the REEL Receptive Age was significant at the $p = 0.024$ level. The correlation $r = 0.2644$

Table 30

Pearson Correlation Coefficients
Rated Functioning Level With Gesell Scores; Fairview Language Evaluation Scale; and The Receptive-Expressive-Emergent-Language Scale

Variable	Rated Functional Level
Gesell Motor	0.1977 p = 0.072
Gesell Adaptive	0.1679 p = 0.108
Gesell Language	0.3535 *p = 0.004
Gesell Personal-Social	0.2322 *p = 0.043
Gesell Developmental Quotient	0.1084 p = 0.213
Fairview Language Age	0.2118 p = 0.059
Fairview Language Quotient	0.2597 *p = 0.027
Fairview Language Level	0.0859 p = 0.265
REEL Receptive Age	0.2644 *p = 0.024
REEL Expressive Age	0.4266 *p = 0.001
REEL Combined Age	0.3813 *p = 0.002
REEL Receptive Quotient	0.0964 p = 0.239
REEL Expressive Quotient	0.1083 p = 0.213
REEL Language Quotient	0.1371 p = 0.157

is a definite but small relationship.

The correlation of rated functional level with the REEL Expressive Age was significant at the $p = 0.001$ level. The correlation $r = 0.4266$ is a moderate, substantial relationship.

The correlation of rated functional level with the REEL Combined Age was significant at the $p = 0.002$ level. The correlation $r = 0.3813$ is a definite but small relationship.

CHAPTER V

DISCUSSION

Special educators have recently acknowledged that traditional language programs have not been successful with the severely retarded. Since language development is an essential component of the total learning process (Bruner, Olver and Greenfield, 1966; Risley and Wolf, 1967), it is imperative to examine alternative approaches to developing communication skills in the severely retarded language delayed child. A total communication teaching strategy has been offered as a possible solution (Larson, 1971; Levett, 1969; Bricker, 1972; Schaffer and Goehl, 1974).

Total Communication Treatment

This study investigated the effifacy of implementing a Total Communication Method of language development training in day schools for severely retarded children, where previously only Oral Communication Methods of language training had been used. The data indicated there were greater mean gains on the language measures for the group receiving the Total Communication treatment than the group receiving only the Oral Communication treatment (See Table 2). The results of the study showed support for the effectiveness of a multi-modality method of language development for stimulating language in severely retarded children (Hollis and Carrier, 1975; Helmick and Hopper, 1975; Kopchich, Rambach and Smilovitz, 1975; Wolf and Rynder, 1975; Wolf and

McAlonie, 1977) (See Appendix D).

The analyses of the data measured by the Fairview Language Evaluation Scale and the Receptive-Expressive-Emergent-Language Scale indicated significant differences due to the Total Communication treatment. Also, the analysis of the Gesell language score revealed significant differences due to treatment. Only the Expressive Quotient measure on the REEL did not indicate significant differences between the groups due to treatment.

Additional studies should be conducted to investigate the effects of individual vs. group structure for the language training programs. Although this study used individual training sessions, the children were in classroom settings in which Total Communication methods were carried through. It is possible that a modeling factor was in operation which increased the effects of the individual Total Communication treatments.

Another important uncontrolled factor that should be considered, was parent involvement. It was possible that the parents of the subjects in the Total Communication group were more involved with working with their children in training programs in the home. There was no attempt made to include the parents in implementing Total Communication techniques at home, although it was possible that some parents sought out information about their child's educational program and carried through with the program which could have increased the treatment effect. Other studies (Grinnell, Detamore, and Lippke, 1976) including parent training in their program, demonstrated greater gains for subjects whose parents implemented the program in the home. By doing

this, there was maximum generalization and reinforcement of the new language skills.

Total Communication Treatment and Therapists' Effects

There were significant differences between the treatment groups on the Fairview Language Age and Fairview Language Quotient due to the therapists administering the Total Communication treatment. A possible explanation for the therapist effect on the Total Communication treatment might be due to the varying expertise of the three therapists. The therapists were comparable in educational background and professional training. All had been trained extensively in Total Communication methods prior to the initiation of the study. However, it was possible that there was a difference in their abilities in working with severely mentally retarded children. Since no objective comparisons or rating of their skills was conducted, this experience factor was an uncontrolled individual difference.

This therapist effect might also have reflected the differences among the schools and also the individual classrooms since random selection of subjects, schools, and treatment was used. The Fairview Language Scale was more sensitive than the REEL in reflecting these effects since it uses smaller increments of redimentary language skills to evaluate the language skills of the severely retarded.

Language Measures

The REEL was constructed to identify very young children who may have specific handicaps. The items were obtained from the developmental literature, although it was not stated how the items were selected.

The scale was normed on a sample of normal infants (Bzoch and League, 1971). Although there is a distinction between receptive and expressive language items, correlational analysis revealed a moderate, substantial relationship between the measures (See Appendix E). The test items did not distinguish among speech, language, and communication behaviors. There was a heavy reliance on oral speech production which might decrease the scale's sensitivity for assessing language abilities of the severely retarded.

The Fairview was constructed to assess language skills of the severely retarded. For that purpose, the scale begins with the most rudimentary language skills and measures small increments of behavior. The language proficiency is rated in terms of present status not in terms of past performance or assumed potential. The scale was not standardized to a group of normal children because there is a question as to whether norms established for normal children can be applied to the severely retarded (Boroskin, 1971). Although the Fairview does not delineate between expressive and receptive language, the items were behavioral and could be objectively measured.

There were high, marked and very high, very dependable relationships between the Fairview Language Age and Language Quotient with the REEL measures. This supported the findings cited previously of significant differences due to the Total Communication treatment. There was also a significant relationship between Language Level and the REEL Receptive and Combined scores. The analyses of the data indicated that although there was a high marked relationship between the normative REEL scale and the Fairview Scale constructed for assessing

the severely retarded that the Fairview was a more sensitive instrument for evaluation of this population.

Total Communication Treatment and Age

Among noteworthy results of this study were the effects of chronological age upon language performance. Chronological age significantly affected language variables (as measured by five of the ten language scores) in an inverse relation. As chronological age increased, test performance declined. This is to say that the preschool age subjects, in both the Oral and the Total Communication treatment groups, had greater gains on the language measures than either the Intermediate or Pre-Vocational age groups (See Appendices F, G, I). These results take exception to recommendations which suggest that auxiliary forms of communication should be provided when the student is well beyond the age at which language should have developed and verbal communication programs have failed (Hopper and Wambold, 1977). The data in the present study that supported other research suggests an auxiliary communication program be initiated for school age retarded children as early as possible (Bricker, 1972).

An interesting finding was that the Pre-Vocational age group in the Total Communication treatment had greater gain scores than the Intermediate age group (See Appendix H). This finding, which contradicts the inverse linear nature of the relationship of chronological age to language performance may be explained by the poorer attendance record of the Intermediate age group (See Appendix J).

Total Communication Treatment and Social Skill Behavior

The Total Communication group had significant mean gains for the adaptive behaviors Language and Vocational Activity. This group also showed significant improvement in the maladaptive behavior domains--Violent Behavior; Antisocial Behavior; Untrustworthy Behavior; Withdrawal; Stereotyped Behavior; Eccentric Behavior; Self-Abusive Behavior; and Sexually Aberrant Behavior. In support of Berger's (1971) research, the Total Communication treatment significantly decreased the behavioral problems of Rebellious Behavior; Unacceptable Vocal Habits; Eccentric Behavior; and Sexually Aberrant Behavior. The 2-way interaction of age and Total Communication treatment significantly improved Independent Functioning and Socialization.

Since it has been generally acknowledged that socialization involves language (Blount, 1969), the data in this study would suggest that training in Total Communication can improve not only the severely retarded person's language skills but also their social responses (Happ and Lyon, 1972; Hoffmeister and Farmer, 1972; Grinnell, Detamore, and Lippke, 1976).

A primary goal of the education of the severely retarded is to enable the person to function and communicate effectively with others in his environment. The data in this study indicated that providing an alternative to previously unsuccessful language programs significantly improved socialization skills without further treatment of specific adaptive or maladaptive behaviors. These findings support other research (Lebels and Lebels, 1975; Topper, 1975) which has shown than delay or failure in teaching functional communication can result

in difficulty in programming attempts, frustration, and maladaptive social behaviors.

Social Skill Behavior and Rated Functioning Level

Although social skill ability has multidimensional behavior domains, it appeared in this study that there were several key components which affected observer rating of the subjects' functional levels. The data indicated that the subjects who scored highest on Domestic Activity; Self-Direction; and Responsibility were observed by raters to be adapting to the environment better than other subjects (See Table 28). Those subjects who had high scores in maladaptive behaviors (See Table 29: Violent Behavior; Rebellious Behavior; Unacceptable Vocal Habits; Eccentric Behaviors; and Psychological Disturbances) were seen to have the lowest functional level.

It appeared that the judges rated the subjects according to what is considered to be 'normal' functioning. That is to say, the subjects who were seen to have fewer maladaptive behaviors and better functional skills were judged more favorably than the subjects who had poorer adaptive skills. There were no significant differences in judged functional level due to sex nor age.

Statements Concerning Internal and External Validity

The external validity of the study can be supported by the size of the sample (n = 56). Although this is not a large sample, it was a large sample size for the problem under discussion.

Experimental variance was maximized by the distinct difference between the two treatment conditions. Each was outlined and defined

to support the internal validity of the study (See Appendices B and C). Internal validity can be supported because random assignment to both the groups and the treatments were used. Individual differences were controlled for by the small select sample that was used. Individual differences should have been low given the learning characteristics and functioning level of the severely retarded.

The language and social skill measures have moderate to high reliability and validity. This should have minimized error variance.

Systematic variance was controlled through use of a large number of treatment sessions which would make the groups sufficiently different after treatment since the groups were homogeneous on all measures at pre-test. Extraneous systematic variance was controlled because of the random assignment of the subjects and the control of sex and age.

Implications and Recommendations

One of the most important implications was that an improvement in one's communicative ability fosters social skill competencies. Since the severely retarded lacked rudimentary forms of communication skills, it was difficult for them to effect changes in their environment. The severely retarded who cannot transmit understandable information to others, must rely on those others to determine the needs which the retarded person could not communicate. It is understandable that frustration and maladaptive behaviors would increase for the severely retarded who had no way to determine his own conditions and effect his own environment. By developing effective communication processes, the retarded person can increase his participation and independence in his

environment.

Another important implication of this study was that it is possible to increase and improve the language skills of some severely retarded students through the implementation of an alternative communication program when a traditional oral communication method previously had not been effective. It was possible that the improved language skills were a result of the application of a systematic instructional technique that was closely monitored and controlled. Too often, teachers tend to become frustrated with the slow progress or even lack of progress of the severely retarded, that the efforts applied in shaping and increasing skills are not enough to meet the need. There is a critical need for further research not only in language development of the severely retarded but also in general instructional technology to provide effective educational programs.

There are many areas in language development training which should be investigated in controlled experimental studies. Issues to be considered are: the comparison of alternative communication systems with a large size sample to control for age, sex, and other possible intervening variables; the effects of parent involvement and training; teacher/therapist variables; reinforcement techniques and schedules; and group vs. individual treatment sessions. Specific to the Total Communication methodology issues to be considered are: does training sign comprehension facilitate acquisition of sign production?; is there transfer of signs trained in one setting with one trainer?; are there differences in acquisition of types of signs (touch/nontouch; one hand/two hand signs)?; and how do the retarded learn signs?.

Education of the severely retarded has relied on the traditional techniques of assessment and instruction used with normal children. If we are to meet the individualized needs of the severely retarded person, efforts should be directed to developing appropriate instruments to measure and to assess abilities and potentials so that better programs can be designed to maximize an individual's strengths and minimize the adverse effects of his deficiencies.

There appears to be great promise and potential for providing better education for the severely retarded. Though there are many and difficult questions yet to answer, progress has and can be made in this field with continued efforts to meet this great challenge.

CHAPTER VI

SUMMARY AND CONCLUSIONS

Problem

This was a study designed to investigate one of the problems facing special educators of the severely mentally retarded--language development training. It was hypothesized that there is a significant difference in training methods used to increase language acquisition rates for the severely retarded. It was further hypothesized that progress in language abilities can facilitate improved social skill performance.

Progress in language development is a process of natural development and maturation in an environment which provides stimulation and guidance. Otherwise, the entire learning process can be limited by deficiencies in the critical communication processes. Development of functional communication skills is requisite if the severely retarded person is to function in a "least restrictive environment".

Approach to the Problem

Fifty-six nonverbal male and female subjects, ages three to 18 years, with a language development age of less than two years, from three schools of the Chicago Association for Retarded Citizens, were randomly selected for this study. All subjects were comparable in their training experience in sensory-motor, self-help, perceptual-motor, and language training.

Procedure

Subjects were randomly assigned to one of two communication methods, grouped by school and age level (a total of 29 subjects in the Oral Communication treatment group; 27 subjects in the Total Communication treatment group). Each subject was pre- and posttested after a twelve month school year on the Gesell Developmental Schedules, the Fairview Language Evaluation Scale, the Receptive-Expressive-Emergent-Language Scale, and the AAMD Adaptive Behavior Scale. In addition, each subject was rated by observers on judged functional level.

The subjects in Treatment Condition One: Oral Communication Method received the oral language program presently used in the CARC schools. The program was formal and structured, and consisted of Pre-Speech; Speech-Sound Imitation; Early Word Recognition; and Building Expressive Language. These subjects received no additional language training and therefore served as control subjects.

In addition to the CARC language program, the subjects in Treatment Condition Two: Total Communication Method received five twenty minute sessions per week using the Total Communication system of language development. This program was formal and structured, and consisted of Attending; Motor and Vocal Imitation; Expressive Language; and Expansion of Expressive Ability.

The language scores were assessed by a 2x3x3 completely randomized ANOVA from a factorial block design. The social skill scores were assessed by a 2x3 ANOVA from a factorial design. Simple correlation analyses were utilized to explore relationships among the language

variables, social skill variables, and chronological age.

Results

The Total Communication method of treatment for language training of severely retarded children was found to be significant as measured by the Gesell language score, the Fairview Language Evaluation Scale, and the REEL Scale. There were significant mean gains for the Total Communication group on the Fairview Language Age, Fairview Language Level, Fairview Language Quotient, the REEL Receptive Age and Quotient, the REEL Expressive Age, and the REEL Combined Age and Language Quotient. This indicated that there were differences between training methods in promoting increased language development for the severely retarded child.

The Total Communication treatment had significant effect on the following AAMD Adaptive Behavior Scale social skill domains: Rebellious Behavior; Unacceptable Vocal Habits; Eccentric Habits; and Sexually Aberrant Behavior. Age had a significant effect on improving scores in Vocational Activity and Sexually Aberrant Behavior. It was shown that there was a 2-way interaction of age and treatment in improving scores on Independent Functioning and Socialization. In addition, there were signficant mean gains for the Total Communication group on Language; Vocational Activity; Violent Behavior; Antisocial Behavior; Untrustworthy Behavior; Withdrawal; Stereotyped Behavior; Eccentric Habits; Self-Abusive Behavior; and Sexually Aberrant Behavior.

There was an inverse relationship between chronological age and language ability as measured by the Fairview Language Quotient and the

REEL Receptive, Expressive, and Language Quotients. There was a positive relationship between age and language ability as measured by the Fairview Language Level due to the inverse construction of the scale (as scores improve--the level decreases).

There was a high, marked, positive relationship between the Fairview Language Age and Fairview Language Quotient with the REEL Scale. The Fairview Language Level was positively correlated with the REEL Receptive and Combined Ages and the REEL Receptive and Language Quotients. This indicates that the Fairview and the REEL are tapping some of the same language abilities.

As language scores increased (on each language measures) the AAMD Adaptive Behavior measures also improved. There were significant relationships between each of the language measures with Language Development; Self-Direction; and Socialization. In addition, the Fairview Language Age was significantly related to Independent Functioning; Economic Activity; and Numbers and Time; Domestic Activity; and Responsibility. There were significant relationships between the REEL Combined Age with Independent Functioning; Economic Activity; Numbers and Time; and Domestic Activity.

As language scores increased (on each language measures) the AAMD Adaptive Behavior Scale measures of maladaptive behavior decreased. There was a significant relationship between each of the language measures with Withdrawal; Stereotyped Behavior; and Inappropriate Interpersonal Manners. The REEL Receptive Age and Combined Ages were significantly related to Rebellious Behavior and Eccentric Habits. The Fairview Language Age was significantly related to Eccentric Habits.

There was a positive relationship between social skill measures of Domestic Activity; Self-Direction; and Responsibility and a rating by judges of functional level. Functional level was rated significantly lower when there were high scores on the maladaptive behavior measures of Violent Behavior; Rebellious Behavior; Unacceptable Vocal Habits; Eccentric Habits; and Psychological Disturbances.

Conclusions

The results of the present study were significant enough to indicate that when oral language training programs have not been adequate to help the severely retarded child increase and improve his skills, the implementation of an alternative, specifically, Total Communication program is justified. There was evidence to indicate that improving the language skills of the severely retarded improved social skill performance. It was also indicated that there was a positive relationship between measured adaptive behavior and judged functioning ability.

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APPENDIX A

chicago association for retarded citizens

member of
CHICAGO ASSOCIATION OF COMMERCE AND INDUSTRY
UNITED WAY OF METROPOLITAN CHICAGO
ILLINOIS ASSOCIATION FOR RETARDED CITIZENS
NATIONAL ASSOCIATION FOR RETARDED CITIZENS

343 south dearborn street
chicago, illinois 60604

operating: day care facilities • adult training centers • residential facilities • referral services

● *312/922-2202*

CHICAGO ASSOCIATION FOR RETARDED CITIZENS
DAY SCHOOL PROGRAM

Date:_____

RELEASES

I hereby enroll my child _____, in the Day School Program of the Chicago Association for Retarded Citizens. I understand that all reasonable care will be taken to promote the safety and welfare of the children and I release the school and its employees from liability from any accident or injury which might occur during school hours.

SIGNATURE:_____
Parent/Guardian

In case of medical emergency, I understand every effort will be made to contact parents or guardian of student. In the event I cannot be reached, I hereby give permission to the physician selected by the school to hospitalize, secure proper treatment for, and to order injection, anesthesia or surgery for my child, as named above.

SIGNATURE:_____
Parent/Guardian

I understand that from time to time the Day School Program of the Chicago Association for Retarded Citizens, in the course of its program, will be taking my child on field trips and other activities away from the school building. I know that care will be taken in the transportation and supervision of the children, and I release the school and its employees from liability in case of injury or accident.

SIGNATURE:_____
Parent/Guardian

chicago association for retarded citizens

member of
CHICAGO ASSOCIATION OF COMMERCE AND INDUSTRY
UNITED WAY OF METROPOLITAN CHICAGO
ILLINOIS ASSOCIATION FOR RETARDED CITIZENS
NATIONAL ASSOCIATION FOR RETARDED CITIZENS

343 south dearborn street
chicago, illinois 60604

operating: day care facilities • adult training centers • residential facilities • referral services

● *312/922-2202*

CHICAGO ASSOCIATION FOR RETARDED CITIZENS
DAY SCHOOL PROGRAM

Date: _____

RELEASES

PERMISSION FOR PHYSICAL THERAPY

I hereby grant permission to the Chicago Association for Retarded Citizens to provide physical therapy treatment for my child, _____, during the course of the Day School Program.

SIGNATURE: _____
Parent/Guardian

PERMISSION FOR PSYCHOLOGICAL

I hereby grant permission to the Chicago Association for Retarded Citizens for my child, _____, to be given a psychological examination and for the information thereby collected to be utilized for both research and training purposes.

SIGNATURE: _____
Parent/Guardian

PUBLICITY RELEASE

I hereby grant permission to the Chicago Association for Retarded Citizens to use my child's photograph for publicity purposes, reproduction in leaflets and booklets, newspaper and magazine stories, television and radio, or advertisements.

SIGNATURE: _____
Parent/Guardian

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CHICAGO ASSOCIATION FOR RETARDED CITIZENS
DAY SCHOOL PROGRAM

Date:_____

RELEASE

I, the parent (or guardian) of _____, a minor _____ years of age, hereby grant permission for my child's participation in a program of research being conducted by Anne Wolfe-Williams.

I understand that no risk is involved and that I may withdraw my child from participation at any time.

_____
(Signature of Parent)

APPENDIX B

PRE-SPEECH THERAPY TREATMENT I

PREREQUISITES TO LEARNING

SKILL	RATIONALE FOR TEACHING SKILL
1. Developing Attending Skills	The purpose of targeting this behavior is (1) to establish beginning skills in looking at or listening to stimuli on request; or (2) to increase the length of time that a child works on a task with or without a distracting environment. For example--child will look at teacher on request and maintain eye contact for five seconds or child will sit on chair for three minutes and manipulate toy.
2. Training Imitation (motor & vocal)	The ability to imitate is the key to learning new behaviors. In teaching a child to imitate, first determine the behavior a child engages in spontaneously. Then, imitate the child performing spontaneous motor or vocal behaviors, and if necessary, help (by physical aid, gestures or verbal cues) the child to imitate in return.
3. Training Comprehension	In order for a child to associate sounds in his environment with objects and actions, it is necessary to talk about the things the child sees and does in consistent simple language. Talk about a child's toys, environment and daily routine. Speech must be functional or useful for it to be reinforcing.
4. Training the Functional Use of Objects	By teaching the individual that language is functional, he has a greater opportunity to use language and to be reinforced for using it. From birth a child learns to look, feel, taste, hear and smell his environment. Gradually a child learns (1) to discriminate one object from another (2) what he can and cannot do with objects, persons or events (3) to associate the words and sounds he hears in his environment with particular actions and objects. For example, balls roll and bounce; cups are for drinking; spoons are for eating.

PRE-SPEECH THERAPY TREATMENT I
SUGGESTED GROSS MOTOR ACTIVITIES FOR IMITATION TRAINING

ACTIVITY	DEFINITION OF APPROPRIATE RESPONSE
1. Ring bell	Child pick up a bell off the table or floor and shakes it so that sound is produced.
2. Beat drum	Child holds a drumstick in hand and strikes the upper surface of a drum producing a sound.
3. Squeak toy	Child applies pressure to a small squeak toy with his hand, producing a squeaking sound.
4. Hands on head	Child places one or both hands on top of his head (above the ears at least).
5. Pat knees	Child hits both knees with palms of hands, striking knees at least twice.
6. Clap hands	Child strikes palms of hands together at least twice.
7. Rub tummy	Child places one hand on his stomach and moves it around.
8. Blow feather	Child blows air from mouth so that feather can be observed to move while teacher holds feather for child.
9. Pat board on table	Child strikes the surface of a small board or a table top with the palm of his hand, producing a thumping sound.

TREATMENT I
CONSONANTAL IMITATION IN ORDER OF INCREASING DIFFICULTY

ORDER OF DIFFICULTY	CONSONANT	REPRESENTATIVE WORD
1. (easiest)	b	boy
	w	way
	m	man
	t	toy
	d	dog
2.	h	hut
	n	no
	k	cut
	p	pie
3.	g	go
	s	see
	f	fat
	j	judge
4.	s	shoe
	r	run
	l	lump
	t	church
	z	zoo
5. (most difficult)		meazure
		that
		thin
	v	vest
	j	yellow
		sing

NOTE: From Bricker, Dennison, Bricker, 1975

TREATMENT I
SUGGESTED ACTIVITIES FOR SPEECH SOUND IMITATION

ACTIVITY	DEFINITION OF APPROPRIATE RESPONSE
1. Child initiated sound imitation	The child begins vocal imitation by attempting to copy the sounds of the people around, but he does this (1) only when they are sounds he can already make, and (2) only if he initiates vocal interaction (child makes sound, teacher imitate child, child imitates teacher) a.) Hold child so you are face to face and talk to him: say "Hi," call his name, repeat the child's own sounds, find different ways to get the child to vocalize. b.) Play imitation games (pat-a-cake, peek-a-boo). c.) Imitate child's motor activities.
2. Model initiated sound imitation	The child begins to imitate many of the sounds and movements a model (teacher, parent) makes provided those sounds and movements are ones the child can already produce. a.) Immediately after a child has made a sound repeat the sound while holding a can or open tube to your mouth; also change pitch of your voice, the loudness, or the expression of your voice. Let child have the opportunity to imitate. b.) Make up rhythmic pattern using the child's sounds. If he can say "ga", "da", or "na", say "ga-ga-ga" or "da-da-da" or "na-na-na". c.) Combine sounds a child can produce with actions he can perform. For example, each pound with a wooden hammer can be accompanied with "ga".
3. Speech sound imitation	The child begins (1) to produce sounds which more closely approximate English sound (mama, dada); (2) using information which sounds like the teachers' or parents'; (3) to attempt to imitate sounds which he has never produced before. a.) When child is vocalizing, introduce a novel sound. Sometimes a change in pitch or tone in your voice will cause a change in the child's vocalizations. b.) Use mirror play. c.) After a child has begun to use sound in rhythmic patterns, change the last sound in the pattern. For example, "ba-ba-da". "ma-ma-ba."

TREATMENT I

SUGGESTED COMPREHENSION ITEMS FOR EARLY WORD RECOGNITION

COMPREHENSION ITEMS	SUGGESTED RESPONSE
1. Hi	Wave or smile.
2. Bye-bye	Wave hands.
3. Night-night	Wave or indicate going to bed.
4. See the - - - (familiar object such as dog or person. Be careful not point)	Child looks in direction, searches for object, e.g., dog, or looks at closely related item, e.g., looks at water dish.
5. Up or down	Child indicates anticipation of being picked up or put down.
6. I'm gonna tickle you	Child smiles, laughs, or indicates the tickle game is about to follow.
7. Come here	Child comes to person giving command.
8. Do you want some_____ (favorite food)	Child looks or points in direction of food, cupboard, or refrigerator.

BASIC FAMILIAR OBJECT LIST FOR VOCABULARY BUILDING

A

apple
arm
automobile

B

baby
bacon
ball
balloon
banana
band
barber
barn
bat
bath
bathroom
bathtub
bathrobe
beads
bed
bedroom
bell
belt
bike
billfold
birds
birthday cake
boat
book
boots
bottle
boy
boys
bread
broom
buggy
bunny
bureau
bus
bus stop
butter
bush
button

C

cake
candle
candy
cap
car
cat
chair
check mark
cheese
chickens
chisel
church
cigarette
clock
closet
clouds
coat
coffee
collar
comb
cookies
cow
crayon
crayon
crying
cup
cupboard

D

danger
desk
dime
dining room
dishes
doctor
dog
dollar
door
down
dress
drum
drummer
duck

E

ears
egg
engine
entrance
eyes
exit

F

farm
farmer
father
field
fingers
fire escape
flag
flower
fly swatter

F (cont'd)

feet
fell
fence
fireman
first aid
fish
foot
fork
fruit

G

galoshes
gate
gentlemen
girl
girls
glass
glasses
gloves
go
goldfish
grass

H

hair
hammer
hand
handkerchief
hat
head
hen
horn
horse
house

I

ice cream
ice-cream cone
in
iron

J

jello
jelly
juice

K

keep off
keep out
kettle
key
kitchen
kite
kitty
knife

L

ladies
lamp
leaf
leg
letter
light bulb
Abe Lincoln
living room

M

mailbox
man
match
meat
men
milk
money
monkey
moon
mother
mouth

N

nails
nose
no trepassing
nurse

O

out

P

paint
paintbrush
pajamas
pan
paper
pen
pencil
piano
pie
plane
pliers
poison
policeman
popcorn
potato
private
pull
pumpkin
puppy
push

R

radio
railroad crossing
rain
rake
razor
road
roof
rope
rug

S

safety pin
sailor
salt
sandpaper
sandwich
Santa Claus
saw
school
scissors
screwdriver
shellac
shirt
shoes
shovel
show
skirt
sled
slide
slow
snowman
soap
socks
soldier
soup
spoon
squirrel
stain
stamp
steel wool
steps
stool
stop
store
stove
street
sugar
suit
sun

T

table
tacks
tea
telephone
television
tie
toast
toaster
toothbrush
toothpaste
towel
train
tray
tree
turkey

U

Underwear

V

vacuum
valentine
vegetables

W

wagon
walk
George Washington
wastebasket
watch
water
wax
wet paint
window
women
woodpecker

Z

Zipper

HYPOTHETICAL SEQUENCE OF GRAMMATICAL DEVELOPMENT

1. "BA" - Sound

2. "BALL" - Word (single-word utterance)

3. "BALL ... ROLL" - Two (related) single-word utterances

4. "ROLL BALL" - Two Word utterances
   (action) (object)

5. "MAMA ROLL BALL" - Three Word (agent-action-object) utterance
   (agent) (action) (object)

6. MAMA ROLL BALL (to) JOHN
   (agent) (action) (object) (prepositional object)

7. MAMA ROLL BALL TO JOHN
   (agent) (action) (object) (prepositional phrase)

8. MAMA ROLLS THE BALL TO JOHN
   (agent) (action) (article) (object) (prepositional phrase)

APPENDIX C

DO'S AND DON'TS FOR TEACHING TOTAL COMMUNICATION TO THE NONVERBAL

1. DON'T use or teach a sign unless you know it correctly and can use it somewhat comfortably.

2. DON'T worry about the distinctness of the client's speech during the use of signs.

3. DON'T make up a sign without asking someone who knows sign language, otherwise you may find you have made up a sign that relates to something completely different.

4. DON'T overemphasize your speech while doing a sign, but do use speech.

5. If a client is able to produce a word intelligibly, DON'T teach him a sign for that word.

6. DO maintain eye contact whenever possible and reward the client with praise whenever eye contact is made.

7. DO use much praise (with children, physical contact, such as hugging) to reinforce the client's good attempts at producing a sign appropriately.

8. DO place the object for which you are teaching the sign directly in the client's sight:

   First, show the client the object and then guide him through the sign. Then present the sign again and encourage him to imitate.

9. DO review old signs before teaching new signs.

10. DO make sure that the client is aware that you are using signs.

11. DO use facial expression to reinforce the meaning of the sign.

12. It is important that the person teaching the signs develop trust, confidence, warmth and effective interaction with the client.

BASIC SIGNING VOCABULARY

I. DRESSING

put on
tie (verb)
take off
hat
coat
boot pants
sock
shoe
button
wear
mitten
shirt
skirt
blouse
dress
zipper
sweater

II. SCHOOL RELATED

book
work
paper
pencil
rug
write
scissors
glue
crayon
draw

III. TRANSPORTATION

bus
car
"L"
bike
wagon
truck
police car
fire truck
train
boat
airplane

IV. COMMANDS

sit down
stand up
come here
hello
stop
wait
walk
go look
yes
no

V. ANIMALS

horse
cow
pig
cat
dog
rabbit
chicken
bird
duck
mouse
fish
bug

VI. BODY PARTS

head
face
eye
ear
nose
mouth
lips
tongue
hair
arm
hand
finger
leg
foot
toe
body

VII. ENVIRONMENT

house
home
room
door
school
steps
stairs
light
floor

VIII. PRONOUNS

i
me
you
they
we
mine
yours
my
theirs

IX. SELF CARE

soap
wash
washroom
sink
toilet
comb
clean
dirty
toothbrush

line
railing
wall
window
table
chair
TV
bed
sky
grass
clouds
tree
park

he
she
his
hers
ours

washcloth
towel
toothpaste
toilet

X. VERBS

eat
sleep
make
walk
run
jump
hop
skip
work
wash
go
come
ride
drink
play
hit
throw
spill
fall
drop
lose
find
to be, etc.
to have, etc.

XI. ADJECTIVES

good
bad
funny
happy
sad
angry
big
little

XII. COLORS

blue
yellow
red
green
purple
orange
black
white
grey

XIII. EATING

eat
ate
cup
glass
spoon
knife
fork
plate
bowl

XIV. BREAKFAST

eggs
bacon
cereal
toast
butter
jelly

XV. MEATS

hot dog
hamburger
chicken

stove
straw
napkin
food
meat
hot
cold
pour
breakfast
lunch
dinner

XVI. VEGETABLES

beans
corn
carrots
spinach
potatoes
peas

XVII. FRUITS

apple
orange
banana
peach
pear
plum
grapes

XVIII. SNACKS

cookie
candy
pretzels
potato chips
ice cream
popcorn
cake
pie
pudding

XIX. DRINKS

milk
water
juice
pop

XX. MISCELLANEOUS

soup
bread
cheese
fish
salad
jello
sandwich

APPENDIX D

APPENDIX D

Subjects, Age, Group, Attendance, Reported Language Gains & Losses

Subject	Age in Months	Group	Attendance	Reported Language Gains & Losses
01	047	1	193	imitates bye-bye; ma-ma
02	084	1	146	follows command "sit down" no longer follows command "come here"; "stand up"
03	062	1	122	points to ears, mouth with assistance; no longer produces vowel sounds or 'b' sound
04	072	1	143	points to baby and car; no longer produces mama, papa
05	058	1	189	imitates 'eat'; comes and sits on command
06	079	10	132	points to boy and girl; signs 'cup' with assistance
07	046	10	173	signs eat, juice; orally imitates mama and baby; pairs words with objects
08	061	10	202	signs eat, juice; toilet, want, drink; orally imitates bye, hi, baby, ball
09	065	10	173	signs boy, girl, milk, eat; says 'ee' for eat; 'pee' for toilet
10	093	10	186	points to spoon, ball, cup, cookie; candy; cookie; signs with assistance spoon, milk, cookie; signs chair, table, eat, candy, want, more spontaneously verbalizations increased-imitates words
11	053	10	188	produces single syllable responses; follows one-step commands; signs eat, juice, toilet, cookie.

Group 01 - Oral Communication; Pre-School Age; School 1
Group 10 - Total Communication; Pre-School Age; School 1

Subject	Age in Months	Group	Attendance	Reported Language Gains & Losses
12	137	2	183	points to cup, bowl, spoon; identifies primary colors by pointing
13	106	2	102	responds to 'no'; no longer makes 'ee' sound for eat
14	118	2	144	points to common objects to identify; says 'ee' for eat; no longer says milk or cookie approximations
15	133	2	179	points to common objects to identify; can place objects on or under on command; sorts colors
16	120	11	193	signs I, want, bowl, cup, milk, napkin, eat, cereal, juice, cookie, tree; can distinguish in/out; on/under by placing objects
17	093	11	188	signs cup, bowl, napkin, eat; rain, sun; signs spoon, I, want, cereal, toilet with assistance; categorizes objects
18	105	11	202	spontaneously signs milk, cup, paper, bowl, play, work, look, cookie, want imitates 2-3 word signing combinations; follows 2-step commands; sorts colors
19	136	11	187	says want, eat; points to identify common objects; signs toilet

Group 02 - Oral Communication - Intermediate Age - School 1
Group 11 - Total Communication - Intermediate Age - School 1

Subject	Age in Months	Group	Attendance	Reported Language Gains & Losses
20	155	3	192	points to identify spoon, cup; says 'ma' for milk
21	189	3	174	says 'ee' for eat; no longer says 'b' or 'm' sounds; needs assistance to identify toilet by pointing
22	162	3	137	now needs verbal cues to point to identify cup, cookie, milk; says 'ee' for eat
23	201	12	175	signs eat and milk on command; signs juice and toilet with assistance; points to identify bowl and cup with verbal prompts
24	164	12	203	follows 2-part commands; signs 20 common objects spontaneously

Group 03 - Oral Communication - Pre-Vocational Age - School 1
Group 12 - Total Communication - Pre-Vocational Age - School 1

Subject	Age in Months	Group	Attendance	Reported Language Gains & Losses
41	080	04	164	says 'mil' for milk' points to mouth; identifies 3 common objects with verbal cue
42	089	04	196	points to 5 common objects; follows simple commands
43	044	04	184	points to simple body parts; produces vowel sounds in imitation
44	066	04	174	points to identify clothing; no babbling present
45	070	04	166	responds to name by looking; no babbling present
46	056	13	179	points to identify common objects; signs eat
47	056	13	186	signs eat and cookie
48	056	13	148	produces 'm' sound for milk; signs eat

Group 04 - Oral Communication - Pre-School Age - School 2
Group 13 - Total Communication - Pre-School Age - School 2

Subject	Age in Months	Group	Attendance	Reported Language Gains & Losses
49	125	05	119	points to identify action pictures; places objects according to verbal directions
50	102	05	187	responds to simple commands; says 'hi'; waves 'bye'; produces 'b' sound
51	118	14	184	sign eat, toilet, drink independently; signs book, hat, coat imitation; matches common objects
52	141	14	172	points to identify action pictures; imitates signs for 10 objects; signs eat independently

Group 05 - Oral Communication - Intermediate Age - School 2
Group 14 - Total Communication - Intermediate Age - School 2

Subject	Age in Months	Group	Attendance	Reported Language Gains & Losses
53	166	06	195	identifies simple body parts with assistance; follows simple commands with verbal directions
54	178	06	192	points to identify 6 common objects; gestures to indicate wants
55	183	15	196	signs 8 common objects; signs and orally approximates toilet; points to identify eating utensils
56	168	15	149	no babbling; imitates sign for eat; follows simple commands

Group 06 - Oral Communication - Pre-Vocational Age - School 2
Group 15 - Total Communication - Pre-Vocational Age - School 2

Subject	Age in Months	Group	Attendance	Reported Language Gains & Losses
25	062	7	184	says ba, ee; mu, co; points to objects to indicate wants; follows simple commands
26	080	7	100	does not respond to simple commands; needs assistance to identify by touching cup, shoe, spoon; responds to speaker by looking; will imitate 'ee' sound
27	080	7	106	identifies cup and plate by pointing; no vocalizations
28	075	16	138	signs candy with assistance; signs eat, milk, toilet
29	069	16	178	signs juice; signs milk with assistance; says 'mu' for milk; follows simple commands
30	091	16	104	signs want, toilet, juice, cookie, says 'b' and 'm' sounds; identifies common objects by pointing

Group 07 - Oral Communication - Pre-School Age - School 3
Group 16 - Total Communication - Pre-School Age - School 3

Subject	Age in Months	Group	Attendance	Reported Language Gains & Losses
31	125	08	179	points to common objects to identify
32	125	08	189	points to common objects to identify; follows simple commands
33	096	08	169	points to identify common objects
34	117	17	144	signs toilet, eat, cookie, shoes; points to identify simple facial features
35	129	17	187	signs eat; points to identify body parts

Group 08 - Oral Communication - Intermediate Age - School 3
Group 17 - Total Communication - Intermediate Age - School 3

Subject	Age in Months	Group	Attendance	Reported Language Gains & Losses
36	162	09	182	points to identify simple body parts; produces vowel sounds
37	159	09	126	produces 'ba' sound
38	160	18	177	identifies common objects; foods; signs eat and toilet
39	161	18	200	points to identify action pictures; signs 25 common words
40	165	18	180	signs 10 common objects; points to identify action words

Group 09 - Oral Communication - Pre-Vocational Age - School 3
Group 18 - Total Communication - Pre-Vocational Age - School 3

APPENDIX E

APPENDIX E

Pearson Correlation Coefficients
Fairview Language Evaluation Scale Scores
And The Receptive-Expressive-Emergent-Language Scale Scores

Fairview Language Level to Language Age		-0.7228 *p = 0.002
	to Language Quotient	-0.7428 *p = 0.001
Fairview Language Age to Language Quotient		0.9900 *p = 0.000
REEL Receptive Age to Expressive Age		0.5857 *p = 0.014
	Expressive Quotient	0.5913 *p = 0.013
	Combined Age	0.9165 *p = 0.000
	Language Quotient	0.8459 *p = 0.000
REEL Expressive Age to Receptive Quotient		0.5757 *p = 0.016
	Combined Age	0.8610 *p = 0.000
	Language Quotient	0.8184 *p = 0.000

APPENDIX F

APPENDIX F

Comparison of Gains on Language and Social Skill Scores: Pre-School and Intermediate Ages

	Group	Mean	Significance
Gesell Language	1	2.7600	
	2	2.5882	
Fairview Language Level	1	-0.1600	
	2	-0.1176	*0.038
Fairview Language Age	1	5.0800	
	2	4.5294	
Fairview Language Quotient	1	2.7520	
	2	1.9576	*0.002
REEL Receptive Age	1	3.2400	
	2	3.2053	
REEL Expressive Age	1	1.9984	
	2	1.6471	
REEL Combined Age	1	2.7800	
	2	2.4118	
REEL Receptive Quotient	1	2.0400	
	2	1.4412	
REEL Expressive Quotient	1	1.0680	
	2	0.5059	*0.009
REEL Language Quotient	1	1.4520	
	2	0.9176	*0.020
Independent Functioning	1	5.0400	
	2	5.0000	
Physical Development	1	1.8000	
	2	1.7059	
Economic Activity	1	0.0	
	2	0.0	
Language	1	1.6200	
	2	1.5294	*0.003
Numbers and Time	1	0.0900	
	2	0.0588	

Group 1 = Pre-School Age
Group 2 = Intermediate Age

Comparison of Gains on Language and Social Skill Scores

	Group	Mean	Significance
Domestic Activity	1	0.8200	
	2	0.7647	
Vocational Activity	1	0.0	
	2	-0.8235	
Self-Direction	1	2.2800	
	2	1.8235	
Responsibility	1	0.6600	
	2	0.5294	
Socialization	1	4.8000	
	2	4.3529	
Violent Behavior	1	-4.0008	
	2	-2.4118	*0.018
Antisocial Behavior	1	-0.9800	
	2	-0.8235	
Rebellious Behavior	1	-2.2400	
	2	-1.5882	
Untrustworthy	1	-0.2400	
	2	-0.1176	
Withdrawal	1	-1.0000	
	2	-0.9412	
Stereotyped Behavior	1	-0.6600	
	2	-0.6471	
Inappropriate Interpersonal Manners	1	-1.4400	
	2	-0.8235	*0.001
Unacceptable Vocal Habits	1	-0.3600	
	2	0.0588	
Eccentric Habits	1	-0.3600	
	2	-0.2882	
Self-Abusive	1	-0.6600	
	2	-0.4118	*0.001

Group 1 = Pre-School Age
Group 2 = Intermediate Age

Comparison of Gains on Language and Social Skill Scores

	Group	Mean	Significance
Hyperactive Tendencies	1	-0.9600	
	2	-0.9412	
Sexually Aberrant	1	-0.2000	
	2	-0.0588	
Psychological Disturbances	1	-1.6600	
	2	-1.5882	
Use of Medications	1	-0.2000	
	2	0.0	

Group 1 = Pre-School Age

Group 2 = Intermediate Age

APPENDIX G

APPENDIX G

Comparison of Gains on Language and Social Skill Scores:
Pre-School and Pre-Vocational Ages

	Group	Mean	Significance
Gesell Language	1	2.7600	
	3	2.6071	
Fairview Language Level	1	-0.1600	
	3	0.0	
Fairview Language Age	1	5.0800	
	3	4.1429	
Fairview Language Quotient	1	2.7520	
	3	1.4786	
REEL Receptive Age	1	3.2400	
	3	3.2343	
REEL Expressive Age	1	3.2400	
	3	2.2143	
REEL Combined Age	1	2.7800	
	3	2.6643	
REEL Receptive Quotient	1	2.0400	
	3	1.6143	*0.003
REEL Expressive Quotient	1	1.0680	
	3	1.0214	*0.002
REEL Language Quotient	1	1.4520	
	3	0.9300	*0.050
Independent Functioning	1	5.0400	
	3	4.9286	
Physical Development	1	1.8000	
	3	0.9286	
Economic Activity	1	0.0	
	3	-0.0112	
Language	1	1.6200	
	3	1.4714	
Numbers and Time	1	0.0900	
	3	-0.1429	

Group 1 = Pre-School Age
Group 3 = Pre-Vocational Age

Comparison of Gains on Language and Social Skill Scores

	Group	Mean	Significance
Domestic Activity	1	0.8200	
	3	0.7857	
Vocational Activity	1	0.0	
	3	0.0	
Self-Direction	1	2.2800	
	3	1.2857	
Responsibility	1	0.6600	
	3	0.2857	
Socialization	1	4.8000	
	3	4.7174	
Violent Behavior	1	-4.0008	
	3	-0.8571	
Antisocial Behavior	1	-0.9800	
	3	-0.2143	*0.001
Rebellious Behavior	1	-2.2400	
	3	-1.0000	*0.003
Untrustworthy	1	-0.2400	
	3	0.0	
Withdrawal	1	-1.0000	
	3	-0.5000	*0.048
Stereotyped Behavior	1	-0.6600	
	3	-0.3600	
Inappropriate Interpersonal Manners	1	-1.4400	
	3	-0.7857	*0.004
Unacceptable Vocal Habits	1	-0.3660	
	3	0.0	
Eccentric Habits	1	-0.3600	
	3	0.5000	
Self-Abusive	1	-0.3600	
	3	0.7143	*0.006

Group 1 = Pre-School Age
Group 3 = Pre-Vocational Age

Comparison of Gains on Language and Social Skill Scores

	Group	Mean	Significance
Hyperactive Tendencies	1	-0.9600	
	3	-0.3571	
Sexually Aberrant	1	-0.2000	
	3	-0.1071	
Psychological Disturbances	1	-1.6600	
	3	-0.2857	
Use of Medications	1	-0.2000	
	3	-0.0714	

Group 1 = Pre-School Age

Group 3 = Pre-Vocational Age

APPENDIX H

APPENDIX H

Comparison of Gains on Language and Social Skill Scores: Intermediate and Pre-Vocational Ages

	Group	Mean	Significance
Gesell Language	2	2.5882	
	3	2.6071	
Fairview Language Level	2	-0.1176	
	3	0.0	
Fairview Language Age	2	4.5294	
	3	4.1429	
Fairview Language Quotient	2	1.9576	
	3	1.4786	
REEL Receptive Age	2	3.2053	
	3	3.2343	
REEL Expressive Age	2	1.6471	
	3	2.2143	
REEL Combined Age	2	2.4118	
	3	2.6643	
REEL Receptive Quotient	2	1.4412	
	3	1.6143	
REEL Expressive Quotient	2	0.5059	
	3	1.0214	
REEL Language Quotient	2	0.9176	
	3	0.9300	
Independent Functioning	2	5.0000	
	3	4.9286	
Physical Development	2	1.7059	
	3	0.9286	
Economic Activity	2	0.0	
	3	-0.0112	
Language	2	1.5294	
	3	1.4714	
Numbers and Time	2	0.0588	
	3	-0.1429	

Group 2 = Intermediate Age
Group 3 = Pre-Vocational Age

Comparison of Gains on Language and Social Skill Scores

	Group	Mean	Significance
Domestic Activity	2	0.7647	
	3	0.7857	
Vocational Activity	2	-0.8235	
	3	0.0	
Self-Direction	2	1.8235	
	3	1.2857	
Responsibility	2	0.5294	
	3	0.2857	*0.034
Socialization	2	4.3529	
	3	4.7174	
Violent Behavior	2	-2.4118	
	3	-0.8571	*0.018
Antisocial Behavior	2	-0.8235	
	3	-0.2143	*0.002
Rebellious Behavior	2	-1.5882	
	3	-1.0000	*0.008
Untrustworthy	2	-0.1176	
	3	0.0	
Withdrawal	2	-0.9412	
	3	-0.5000	
Stereotyped Behavior	2	-0.6471	
	3	-0.3600	
Inappropriate Interpersonal Manners	2	-0.8235	
	3	-0.7857	
Unacceptable Vocal Habits	2	0.0588	
	3	0.0	
Eccentric Habits	2	-0.2882	
	3	0.5000	
Self-Abusive	2	-0.4118	
	3	0.7143	

Group 2 = Intermediate Age
Group 3 = Pre-Vocational Age

Comparison of Gains on Language and Social Skill Scores

	Group	Mean	Significance
Hyperactive Tendencies	2	-0.9412	
	3	-0.3571	
Sexually Aberrant	2	-0.0588	
	3	-0.1071	
Psychological Disturbances	2	-1.5882	
	3	-0.2857	
Use of Medications	2	0.0	
	3	-0.0714	

Group 2 = Intermediate Age
Group 3 = Pre-Vocational Age

APPENDIX I

APPENDIX I

Comparison of Gains on Language and Social Skill Scores: Total Communication Group Only: All Ages

	Group	Mean
Gesell Language	1	4.4818
	2	4.2500
	3	4.4429
Fairview Language Level	1	-0.3636
	2	-0.2500
	3	0.0
Fairview Language Age	1	7.4545
	2	7.3750
	3	6.6429
Fairview Language Quotient	1	3.9909
	2	3.4250
	3	2.3857
REEL Receptive Age	1	5.8182
	2	5.6250
	3	5.5714
REEL Expressive Age	1	4.0000
	2	3.1250
	3	3.9241
REEL Combined Age	1	4.8571
	2	4.3750
	3	4.4071
REEL Receptive Quotient	1	5.1182
	2	3.0250
	3	2.4714
REEL Expressive Quotient	1	1.9545
	2	1.3500
	3	1.9400
REEL Language Quotient	1	3.5273
	2	2.1000
	3	2.2429
Independent Functioning	1	7.0750
	2	7.3711
	3	7.8571

Group 1 = Pre-School Age
Group 2 = Intermediate Age
Group 3 = Pre-Vocational Age

Comparison of Gains on Language and Social Skill Scores

	Group	Mean
Physical Development	1	1.8162
	2	1.6250
	3	1.4286
Economic Activity	1	0.0000
	2	0.0000
	3	0.0429
Language	1	3.2857
	2	2.1250
	3	2.3636
Numbers and Time	1	0.1250
	2	0.0
	3	-0.2857
Domestic Activity	1	0.8750
	2	0.8007
	3	0.8668
Vocational Activity	1	0.0
	2	-0.3750
	3	0.0
Self-Direction	1	2.8571
	2	2.3000
	3	2.4545
Responsibility	1	0.8750
	2	0.5714
	3	0.4909
Socialization	1	6.8571
	2	1.7500
	3	3.2500
Violent Behavior	1	-4.0000
	2	-2.0909
	3	-0.9001
Antisocial Behavior	1	-4.2500
	2	-1.5455
	3	-1.2887
Rebellious Behavior	1	-2.6250
	2	-0.6364
	3	-0.4286

Group 1 = Pre-School Age
Group 2 = Intermediate Age
Group 3 = Pre-Vocational Age

Comparison of Gains on Language and Social Skill Scores

	Group	Mean
Untrustworthy	1	-0.2500
	2	-0.0909
	3	0.0
Withdrawal	1	-1.0909
	2	-1.5714
	3	-1.4710
Stereotyped Behavior	1	-0.6364
	2	-0.3750
	3	-0.0909
Inappropriate Interpersonal Manners	1	-1.0000
	2	-0.8751
	3	-0.8757
Unacceptable Vocal Habits	1	-0.5455
	2	-0.4250
	3	-0.4279
Eccentric Habits	1	-1.8750
	2	-1.4286
	3	-1.9091
Self-Abusive	1	-0.2500
	2	-0.1818
	3	-0.1429
Hyperactive Tendencies	1	-1.2500
	2	-1.0000
	3	-0.7143
Sexually Aberrant	1	-0.7818
	2	-0.1250
	3	-0.6990
Psychological Disturbances	1	-2.5455
	2	-1.6250
	3	-0.1429
Use of Medications	1	0.0
	2	0.1429
	3	0.1818

Group 1 = Pre-School Age
Group 2 = Intermediate Age
Group 3 = Pre-Vocational Age

APPENDIX J

APPENDIX J

Mean Attendance By Group

Group	Attendance
1. Pre-School: Oral 1	161
2. Intermediate: Oral 1	151
3. Pre-Vocational: Oral 1	167
4. Pre-School: Oral 2	183
5. Intermediate: Oral 2	153
6. Pre-Vocational: Oral 2	176
7. Pre-School: Oral 3	179
8. Intermediate: Oral 3	130
9. Pre-Vocational: Oral 3	154
10. Pre-School: Total 1	192
11. Intermediate: Total 1	166
12. Pre-Vocational: Total 1	189
13. Pre-School: Total 2	171
14. Intermediate: Total 2	178
15. Pre-Vocational: Total 2	172
16. Pre-School: Total 3	165
17. Intermediate: Total 3	140
18. Pre-Vocational: Total 3	167

APPROVAL SHEET

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The dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

11/26/79
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